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MILITARY SURGERY.

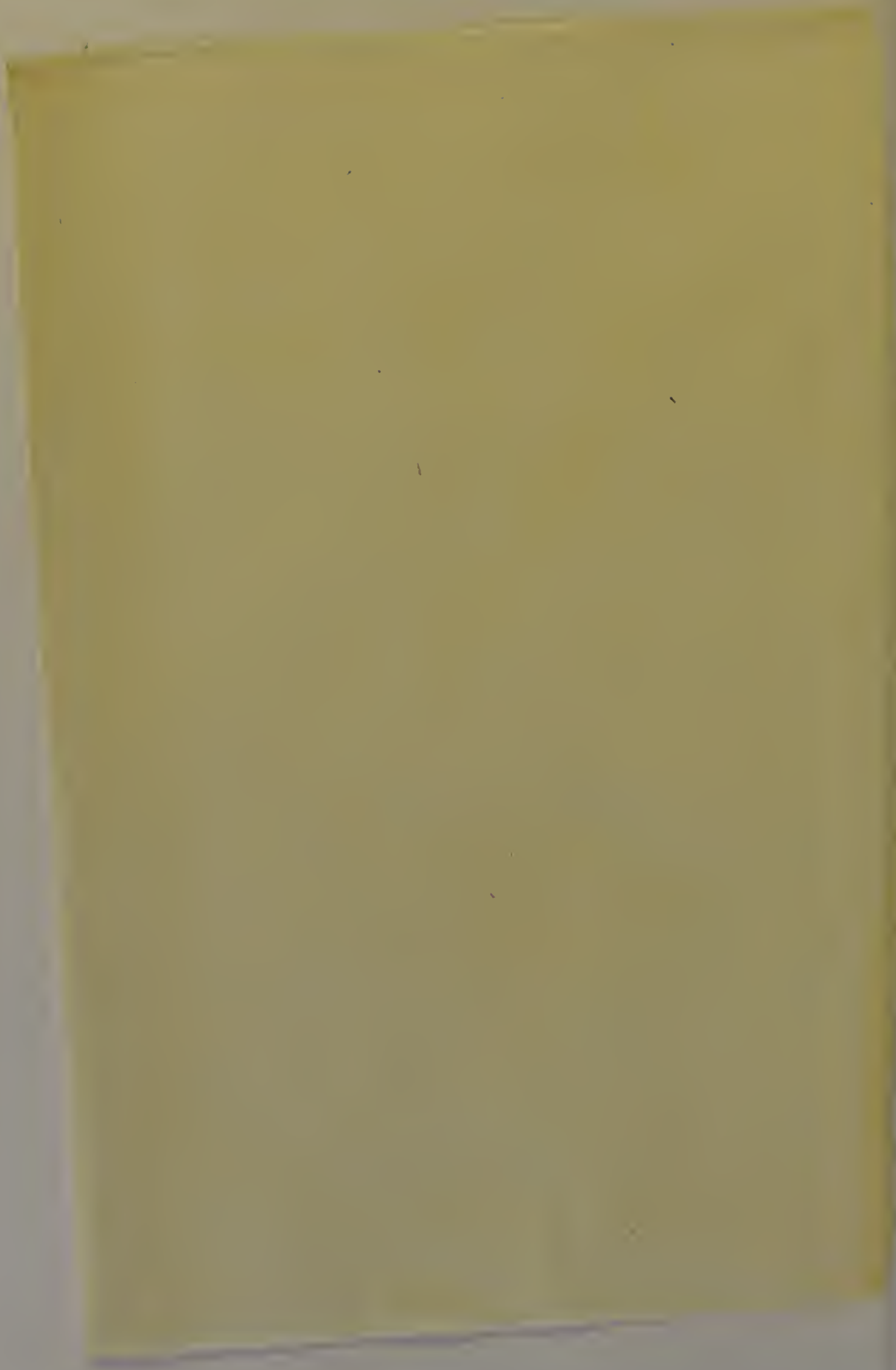
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WEISS' BALL EXTRACTOR





MILITARY SURGERY;
OR,
EXPERIENCE OF FIELD PRACTICE
IN INDIA

DURING THE YEARS 1848 AND 1849.

BY

J. J. COLE, M.R.C.S.E. H.E.I.C.S.

LATE

SURGEON TO THE AUXILIARY FORCES DURING THE WAR IN THE PUNJAUB.



LONDON:

S. HIGHLEY AND SON, 32, FLEET STREET,

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1852.



TO

BENJAMIN HARRISON, Esq.

LATE TREASURER OF GUY'S HOSPITAL,

AND

JOHN LOCH, Esq.

OF THE COURT OF DIRECTORS OF THE HONOURABLE EAST INDIA COMPANY,

This Work is Dedicated,

IN GRATEFUL ACKNOWLEDGMENT OF THEIR KINDNESS
AND FRIENDSHIP

TO

THE AUTHOR.

PREFACE.

THIS work was written during short intervals of health, from recollections of the past ; and is wholly the result of practical experience in the field, under circumstances, perhaps, of no very ordinary character.

The source from whence the matter was taken may be described in a few words. Having reached India in November 1847, in June 1848, by a combination of somewhat singular occurrences, I found myself in medical charge of Lieutenant Edwardes' army (18,000 strong), then encamped before Mooltan, into which it had driven the rebel Moolraj and his troops. The wounded of Lieutenant (now Major) Edwardes' force in the battles of Kuncyrch and Suddozam,—in various skirmishes,—in the first siege of Mooltan,—during six days' cannonade from six of Moolraj's guns,—in the

battle of Soorajkoond,—in the second siege of Mooltan ; also the whole of the enemy's wounded found within the city, and great part of those in the fort ; together with the wounded in the siege of Luckkie, and numerous casualties necessarily happening in so large a force,—passed through my hands.

There were cases of every degree of severity, kind, and description, presenting on the whole an ample field for observation, and affording matter sufficient, perhaps, for a considerable work, comprehending the whole subject of primary and subsequent treatment of wounds, with a full description of the operative part, which in my case, having neither health to write, nor money to spare for printing, I have been compelled only to touch upon, or wholly leave out.

14, BARK PLACE, BAYSWATER,

July, 1852.

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MILITARY SURGERY.

PRELIMINARY OBSERVATIONS.

MILITARY SURGERY, viewed as a science, differs not from surgery in general. It is governed by the same laws, founded on the same principles, and admits only of the term “military surgery” in contradistinction to surgery, inasmuch as it differs somewhat in practice; namely, in the first place, it is more difficult, and less certain in its effects,—being practised under less favourable circumstances. It requires, *par excellence*, promptitude and decision. Moreover, courage of the highest order is essential to it: on the one hand, to render the surgeon superior to scenes of horror and disgust; on the other, to keep him steady and collected under personal danger.

Again: it differs in regard to treatment; not, indeed, greatly in a therapeutical point of view, but in the application of means to ends.

In short, the *methodus medendi* must necessarily be much modified,—by climate, by locality, by immediate circumstances, and, more than all, by want of means, which, at one time, compels the surgeon to administer one remedy for another, and to use a less desirable instrument when another is not at hand.

Thus it happens, that Military Surgery, or, more properly speaking, Field Practice, is more or less governed by fortuitous circumstances, which will continue—withstanding the best arrangements—to exert some influence over it. It will be well for the young surgeon to remember this, and to be above its effects.

Again : Field Surgery differs inasmuch as it presents cases seldom met with, except upon the field. And the inquiring surgeon has ample opportunities of estimating the comparative merits of primary and secondary operating, by witnessing the infliction of those wounds which it is his immediate care to heal.

And, lastly, it differs from surgery in general, so far as it needs a more heroic and decided form of treatment, and more energetic—although, perhaps, less elegant—remedies. It peremptorily demands good and skilful surgeons, who practise on the principles of their art, and according to some fixed system *applicandi remedium*, which, however, they are ready to deviate from as occasion may require.

To be bound down to any given system—no matter however good—will assuredly embarrass the surgeon in the field ; but, being well grounded in the principles

of his profession, he casts from him all superfluous matter, and, ever holding in view the ultimate welfare of the patient, he bends his energies to that great end, and adapts his measures agreeably to time, place, and circumstances, with promptitude and vigour, and with a fair and hopeful prospect of success.

GENERAL REMARKS.

WE purpose dividing our subject into two parts. In the first, we shall take a general view of the injuries that come within the province of the Military Surgeon. In the second, we purpose treating of each particular case, and shall at some length point out the remedial measures which we have uniformly found most efficient.

INJURIES COMMON ON THE FIELD OF BATTLE.

The various lesions of the body to which the soldier is imminently obnoxious in the field, may be enumerated as follows; viz. Cannon-shot and shell wounds. Grape-shot, musket, and pistol-bullet wounds. Punctured wounds, — from sword, lance, or bayonet. Sword-cuts, or incised wounds. Simple and compound fractures. Dislocations and sprains. Concussion and compression of the brain. Burns from the explosion of powder. Poisoned wounds. Affections of the head from exposure to the sun. Fainting from fatigue. Exhaustion from want of food or water. Violent pains in the abdomen. Retention of urine. Iritis and ophthalmia. And, lastly, the various forms of tetanus.

GUN-SHOT WOUNDS.

The five former kinds of injuries are comprehended under the head *Gun-shot wounds*; but it is fit to consider them severally, according to their degree of severity. Cannon-ball wounds, therefore, peremptorily claim our earliest attention, inasmuch as they are pre-eminently the most violent and fatal.

The cannon-shot is generally more destructive even than the exploding shell, because its range and momentum are much greater. For the first five or six hundred yards, it grinds to powder and destroys everything that opposes its hissing course. For as many more, its progress is little less terrible: it tears its way through everything tearable, and at length expends its fury in the earth, or, in long and angry bounds, exhausts its strength, and finally rolls to your feet, apparently a harmless thing. To the last, however, it is most dangerous to approach the moving round-shot: and we have ourselves amputated limbs which had been smashed to pieces by balls that, to all appearance, were incapable of injuring the uncovered foot.*

* Before Mooltan, I removed a boy's limb (æt. 10) near the hip-joint. He was struck by a six-pounder close to our tents. He declared he thought the shot had stopped, and ran to pick it up. This wound was situate so near the groin, and bled so freely, that I thought fit to amputate upon the spot. The patient speedily and effectually recovered.

For the first and second part of its course the deadly round-shot (meeting with no inanimate obstruction) kills upon the spot any unhappy individual with whose head or trunk it comes in contact, and to the end of its flight it is much the same; but the soldier does now and then recover after having received a cannon-ball full in the face, chest, or abdomen, as we shall hereafter see.

When the cannon-ball at the height of its velocity strikes full upon a limb, that limb is in effect carried away, and amputation of the stump is obviously inevitable. In all cases, no question can arise in the surgeon's mind as to the propriety of operating; his course is palpably clear.

The appearance of a wound of this nature is generally much as follows:—If a European's, the skin looks more or less livid. If an Indian's, blacker than natural. The tissues are torn through, and hang down in shreds. Small portions of the muscles, veins, arteries, and other structures, come away when you pinch them with the finger and thumb; and the exposed surface of the truncated bone is almost ground to powder. In fact, all structures, for a short distance above the actual injury, may be said to be physiologically dead. There may be no hæmorrhage. It is, however, wrong to suppose that bleeding does not follow these wounds,—wrong to suppose that much bleeding does not follow; for, in truth, in many cases, considerable hæmorrhage takes place, and many a valuable life is lost from this very cause. Many a

soldier dies upon the field from loss of blood, whose life might have been saved by the prompt assistance of the surgeon. In the field-hospital, the wounded man is brought to you: he has lost a limb, and there is literally no hæmorrhage; but is he not faint, and incapable of speaking? His body is cold; his pulse scarcely perceptible; his respiration slow and labouring; and his clothes covered with blood. See him on the field, on the spot where the round-shot strikes him, and you will find bleeding sufficient to call forth your best skill to restrain. We have seen blood pour out in florid streams;—we have seen it pour through every covering that a wounded man's comrade could apply: and we have seen it ooze in no small quantity from a wound long after the receipt of the injury. Enough has been said, then, to prove that hæmorrhage follows injuries from shot and shell. We ourselves are accustomed to look upon loss of blood as the first thing to be guarded against in all gun-shot wounds, and we hasten to our patients accordingly. If we do not, we shall assuredly lose many of them. It is the safer plan—it is the better principle—to view all wounds of this nature as hæmorrhagic; although it is unquestionably true, that many gun-shot wounds do not bleed at all.*

* A soldier had his leg carried away during the first siege of Mooltan, close to my tent. He lost scarcely an ounce of blood: what he did lose was venous. This patient suffered very severely from the shock, but rallied during amputation, and did well. Chloroform would have killed him.

Why some wounds bleed, and others do not, is by no means easily accounted for. Sometimes wounds of the upper extremities bleed more than those of the lower, and *vice versâ*. At one time, you meet with considerable hæmorrhage where you have reason not to expect it. At another, you find none where, according to the rules laid down by authors, it ought to be. All that has been said with respect to the contraction and retraction of lacerated arteries is correct, inasmuch as, other things being equal, they do contract and retract to the saving of many a life. But whether hæmorrhage will or will not follow a gun-shot wound mainly depends on the amount of physical prostration and collapse produced by the violent shock to the general system, or rather to the heart and vascular system, which are chiefly affected in all such cases; syncope following as a consequence of insufficient supply of blood to the brain.

It should be remembered that the fainting and collapse we now speak of differ widely from those forms of stupor and insensibility which follow immediate violence to the head. The former depend on arrest of the circulation, the latter on a shock to the brain and nervous system itself. In the first example, little is to be feared when reaction takes place; in the second, inflammation and its consequences are to be guarded against. Of course the treatment differs as widely as the diseases themselves, and too much care cannot be taken in distinguishing them. When direct violence to the cranium accompanies serious

injury to an extremity, the case is one of the most formidable the surgeon meets with in the field,—with regard to which there is little or nothing to be done, but to enjoin the strictest quietude for an indefinite period.

We have just said that the round-shot, when it fairly impinges on a limb soon after leaving the gun, inevitably destroys it: the member is for ever lost! The injury that necessarily entails so serious a deprivation must obviously be severe and perilous. Nevertheless, the wound is not so dangerous to life, or nearly so difficult to treat, as the injury the same shot is about to produce when it has travelled four or five hundred yards further, or when, perhaps, it has nearly reached its goal: then it is that it occasions the most severe lesions which can befall the extremities of man. In the former instance, the missile cuts comparatively clean through the tissues, without materially injuring the parts above. Its rapidity is so great, that it has not time, as it were, to do mischief but to the structures with which it actually comes in contact. In the latter (having lost somewhat of its impetus), it tears its way, apparently with some little difficulty, through the structures, and hangs in the wound long enough to impart its destructive influence to the adjacent tissues. The wound, for the most part, has the following untoward aspect, viz. the integuments are extensively lacerated above and below; the muscles dreadfully torn and separated from their attachments, and their interspaces are filled with coagulated blood; vessels,

nerves, and tendons hang down in shreds; the bones are fearfully comminuted, and, worse still, sometimes fractured a considerable distance from the wound itself. For example, when the seat of injury is just above the ankle-joint, the tibia may be split up, or broken close to the knee; or when the knee itself, or the thigh immediately above it, is destroyed, the femur may be fractured in the middle of its shaft, close to the trochanter minor, or even as high up as the neck of the bone. These cases are, consequently, imminently dangerous, and difficult to deal with, and the surgeon has an unenviable duty to perform. He must, nevertheless, do it with promptitude and decision, no matter how painful it may be.

The next forms of injuries which claim our attention are flesh or superficial lacerated wounds. And these may be divided into three kinds, namely, the transverse, (and they are by far the most dangerous), those that are accompanied with slight lesion of bone, and the longitudinal, or those that, either upwards or downwards, take the course of the muscles, vessels, and nerves.

Our first division of these injuries, as we have before said, is by far the most dangerous, and for the following obvious reasons,—viz. 1st, there is much greater loss of substance in proportion to the extent of the wound; 2d, the muscles are much more torn, being often completely divided,—a large piece, perhaps, wholly carried away. The large and deep-seated vessels are greatly endangered, and, for the most part,

either lacerated or cut through, to the imminent peril of life. Again, a neighbouring bone is not unfrequently seriously damaged (although untouched) by having its periosteum bruised, raised, or, what is almost fatal to its integrity, peeled off its shaft in a circular strip. But the most fatal of all these conditions (and which we shall more particularly notice in speaking of incised wounds), is laceration or division of the large and deep-seated veins. Indeed, we look upon wounds of these vessels as more to be feared than those of arteries themselves (except in their immediate consequences); and it will be seen, that painful and formidable operations are necessary to save life when veins are severed, the wound itself being comparatively of minor import.

The second form of which we speak is noticeable as being accompanied with lesion of bone. It is not, however, in any great degree more dangerous from this cause, although the cure may be considerably prolonged. For example, a large portion of the trochanter major may be knocked off, three or more inches of the fibula may be carried away, a piece of the tibia, or a small chip of the femur itself, cut out, and, notwithstanding, all may do well. In fact, where no large vessels are implicated, and the patient has an average constitution, there is every reason to expect a safe and speedy recovery, with little or no deformity of consequence. Lastly, our third division of these injuries demands attention, as it presents the most

complete specimens of superficial lacerated wounds that can be conceived, and they are frequently of wonderful extent. Their immediate effects upon the general system are now and then considerable, but, with ordinary care, they soon subside; and, on the whole, these wounds may be looked upon as by no means dangerous to life. Much, of course, will depend on the nature of the structures torn through or carried away, and upon the seat of the injury itself. In our practice (which has been pretty considerable with this kind of wound), we do not remember having lost more than a dozen patients, although, in many cases, the solution of continuity of soft parts was very considerable. Sometimes, indeed, these lacerations are so extensive as to appear greater than even round-shot themselves are capable of producing. For example, the muscles and integuments of the back may be ploughed up from the spinous process of the last cervical vertebra to the sacrum; or the thigh laid open from the trochanter major to the knee-joint; or the leg, from the popliteal space to the heel. The skin in these cases will, of necessity, be fearfully torn, and more or less disposed to slough, according to the extent of separation from the subjacent structures. The loss of substance will depend mainly on the depth of the wound; and the amount of suppuration will be smaller or greater, according to the extent of laceration. Four things are chiefly to be guarded against here, namely, constitutional irritation and general

prostration, violent inflammation, and exhaustion from the copious and long-continued discharge of pus.*

Rigors now and then follow these accidents, which, when severe, are indicative of serious general disturbance. The systemic circulation is enfeebled, and the pulmonary interrupted, to the great danger of life, if reaction be not speedily brought about.

The last class of round-shot and shell wounds which particularly deserve consideration, are the contused; and they are dangerous or otherwise, according to their locality. When accompanied with lesion of bone, they demand most serious attention, and often painful and difficult operations.

With regard to what has been written and said relative to the injurious effects of the air put in motion by the cannon-ball, we must express our firm conviction that it is wholly erroneous; for we do not believe it possible for the "wind" of a shot to occasion the serious injuries which have been attributed to it. When the round shot (particularly one of the larger kind) passes through the air, a loud hissing, rushing sound is heard: this is evidently produced by the rushing together of the air in its wake. When the ball passes within a few yards of a soldier's head, it has a startling effect. When within a few feet, and

* At the battle of Soorajkoond, I picked up a soldier in the field who had just been wounded in the thigh. The round-shot touched the hip-bone, exposed the femur in two places, and escaped at the head of the fibula, laying open a wound eighteen inches by nine. The patient completely recovered.

the shot is a heavy one, a man in a passive state may be thrown down by the sudden fright; but if the soldier be in the heat of action, he will not notice the destructive messenger, even though it pass within an inch of his head. We have seen the plate taken from a soldier's breast without his being aware of the slightest shock; and we have ourselves been near enough to many a shot to feel its wind, if it had any to impart. It is, however, unquestionable, that all cases attributed to the above cause should be laid to the contact of the ball itself; and we are satisfied, that the missile actually strikes the injured part in all and every instance, light although the blow may be.*

It is occasionally difficult to say why external evidence of injury is not present, when much pain, and even death itself, follows the contact of a cannon-ball. In the abdomen we frequently find it so; and in the head, too. When the head is the seat of injury, the symptoms present themselves much in the following order:—The patient may or may not be knocked down,

* In our first advance upon Mooltan, a native soldier was struck by a round shot on the back of the head. He was sleeping in the trench, and did not appear to feel the blow, but slept on; however, much swelling followed, and he suffered considerably from extravasation of blood. General Cortlandt and Lieutenant James were lying in the trench near this soldier when the shot came in. They thought the man must have been killed; but as he only turned, and went to sleep again, they concluded he had escaped. In the morning, a small pool of blood called their attention to the case. The patient got up, and walked to my tent.

or he may not, perhaps, be cognizant of having received a blow. Sometimes severe pain is felt, and a puffing up of the part instantly follows; at others, there is little or no pain, and the soldier replaces his cap, which had been knocked off, and turns again to the business in hand. By and by, however, he becomes aware that all is not right; he feels giddy, perhaps a little sick,—his cap feels tight, and hurts his head. He retires, and you find him suffering a good deal, with more or less swelling of the integuments of the cranium. When the hair is removed, slight discolouration of the skin may or may not present itself; but there is abundant evidence of subcutaneous lesion. Irritative fever, superficial and deep-seated inflammation, together with extensive suppuration, are to be guarded against. Very extensive extravasation of blood now and then follows, with serious consequences, difficult to manage.

When the neck, chest, or upper extremities, are the parts injured, according to the violence applied so will the difficulty of cure and danger be. Sometimes pus forms, and burrows; sometimes the skin sloughs, leaving an indolent unhealthy sore; and occasionally thoracic effusion, with its consequences, supervenes.*

* At the battle of Soorajkoond, when the Sikhs attacked the allied camp, they were met on the banks of a deep canal by some companies of Cortlandt's sepoy, led on by a very brave man (Quin) who was in Major Edwardes' employ. He had, however, scarcely proceeded fifty yards, when he received a six pound shot full in his chest. The gun that discharged the ball

When, unhappily, the abdomen is the part injured, and its upper region, particularly the scrobiculus cordis, is the portion impinged upon, instantaneous death most often follows. In the cases which have fallen to our care, we uniformly noticed little external injury; in some, none. In two or three instances there was considerable puffing up of the abdominal integuments, and the intestines appeared distended with air. The chief symptoms here, are arrest of the heart's action, indicated by extremely feeble or totally imperceptible pulse, and most laborious thoracic breathing. The intellects retain their power commonly even to the last; but dissolution soon follows if relief cannot be given. The above fatal effects are clearly the result of shock to the plexus of ganglionic nerves which are distributed to the abdominal viscera from the semi-lunar ganglia. To stimulate the heart and vascular system to renewed action, to restore the respiratory processes, and to maintain the natural warmth of the body, are the curative measures obviously called for here, and no time is to be lost in endeavouring to

was not more than five hundred yards distant; but, fortunately for the individual, the missile first struck a bank, and, hopping over, fell upon his chest, just below the right breast. I saw him on the spot. Respiration was suspended, and the pulse imperceptible. He, however, soon revived, and I sent him into hospital on my own horse. Before the end of the action I met him again on the field; but he did not recover the effects of the wound for many months, a troublesome sore following, over which, for a time, remedies appeared to have no control.

bring them about. Inflammation of the peritoneum, or enteritis, may follow, or an abscess form underneath the integuments. These are consequently to be guarded against; and when they appear, should be met with as active treatment as the patient can possibly bear, as they often run high, and give considerable trouble.

Contused wounds of the extremities not being immediately dangerous to life, most frequently come under the notice of the surgeon. Of course, their importance and severity will depend upon the amount of violence applied, and more particularly on the nature of the structures injured. When the elbow, knee, or ankle-joint is concerned, the accident must be considered a most serious one. Due care is to be taken in ascertaining the presence of fracture; and too much care cannot be used in the treatment of the case. When the knee-joint is the seat of mischief, together with painful local symptoms, the constitutional will be for the most part severe. In restoring the circulation and warmth of the system, it must be remembered that stimuli of all kinds will have an unfavourable effect on the local disease: this is to be provided against, if possible.

Sometimes, when a fragment of a shell, especially if large, falls upon the fleshy portion of a limb, very extensive extravasation of blood, with great swelling, follows; and, if the subjacent bone be also bruised, the case is a bad one: if not, the prognosis will be favourable, although much swelling and ecchymosis remain for a considerable period.

CHAPTER II.

THE lesser kinds of gun-shot wounds now remain to be treated of ; and they are those of grape-shot, musket and pistol bullets. It is not necessary, however, to speak of these separately, further than to call attention to the different size of the balls. The difference in the size of the bullet, however, docs not always in any great degree increase the danger of the wound, for the pistol-ball is as fatal within its range as that of the musket, or the single grape-shot itself. When many grape-shot strike the same individual, death is the immediate consequence. When they impinge upon a limb, the case falls under the head Cannon-shot injuries. When one single grape strikes, (although the wound may be somewhat larger,) it differs not from that of the musket or pistol ball ; so we may treat of these under one denomination, and proceed to speak of those which befall the head. The slightest kind of injury of this nature is that in which the ball merely strikes the cranium without raising the skin. Occasionally, however, as with the round shot, subintegumental inflammation, with its consequences, follows. In those instances where the soft parts are torn, the wound is of the bruised and lacerated character, and the bone may be

injured in the following manner—namely, the periosteum may be torn, and the osseous structure itself bruised : when this last happens, the case is serious. Indeed, it will be seen that contusion of bone and periosteum forms an important class of injuries, and well deserves our best attention.

When the ball fairly impinges within range, the head is generally shot through, and in the great majority of cases death is instantaneous, or soon follows. There are, nevertheless, a variety of exceptions to this rule, which we are every day meeting with, and every day puzzled to account for. Sometimes a single grape, musket, or pistol ball, coming in full contact with the skull, flies off at a tangent, or runs upwards, downwards, or laterally beneath the skin, and passes out ; at others the ball perforates the tables of the cranium, and remains lodged in the bone, or by some extraordinary route escapes, without leaving any fatal effects behind. Again, it may pass completely through the head, entering, perhaps, at the occipital tubercle, making its exit above the eyebrow, or coming out through the eye itself ; and still death may not be the result. Apparently, here the ball passes through the substance of the brain ; traversing, for example, one hemisphere. We do not, however, think that the missile actually goes through the cerebral mass to the depth indicated by the aperture of ingress and egress, as it must be remembered that a ball scarcely ever passes directly into a bony cavity. It drives before it the piece of bone upon which it strikes to a greater or lesser distance,

and turns from the direct course itself, giving, perhaps, one chance of escape to the patient by avoiding the more dangerous structures, and traversing those that can recover from its dreadful effects.

Therefore, when the ball has not escaped, and it is desirable to ascertain its position and to remove it, we may expect to find it considerably out of the direct line,—either above or below, on the right or left hand. In these cases, more particularly when the bullet remains in the head and cannot be found, and also when there is extensive fracture of the cranial tables, together with the symptoms concomitant on such injuries, our prognosis must necessarily be most unfavourable. In truth, we are compelled to view all such cases as inevitably fatal; but there are exceptions, and not unfrequent ones, wherein the patient recovers when we dare not hope for so desirable a result. There are many soldiers now doing duty in our ranks, for whom (having been wounded in their heads during the late war,) the medical officers had not the smallest hope; and every military surgeon who has had much practice in the field, has learned not to despair so long as life remains.

It is not our object or wish to draw particular attention to extreme cases, to the neglect of apparently less important ones; nor should we like it to be supposed, that in speaking of such and such wounds we for a moment deviate from the direct truth in supplying cases illustrative of our subject. In treating, however, of extremes, we comprehend all cases of minor import,

and in stating cases we prove our position as satisfactorily as possible.

When we come to consider the treatment of the various lesions, we shall from our own experience append such cases as we hope will interest and give confidence in our measures. “*Experientia docet.*”

Experience has not failed, in our case, to teach us many things of which we knew but little previous to being placed in charge of a large army; and our uncontrolled practice with the irregular force at Mooltan must necessarily have given abundant opportunities for observation, which could not fail to benefit: and we hope the results of our experience will in some measure benefit those of our *younger* brethren, who cannot have had much practice in the field.

We shall now briefly speak of gun-shot wounds of the neck; and they are serious or otherwise according to their depth and locality. When in the posterior aspect and not deep, little is to be feared from them; but they are occasionally, even here, troublesome, and apt to leave behind ugly cicatrices and inconvenient contractions. In our remedial measures these are to be guarded against. If the front of the neck be unhappily the seat of mischief, the affair has a very serious aspect, and the wound most commonly proves fatal. When instantaneous death follows a gun-shot wound of the neck, it is probably the consequence of injury to some of the important cervical nerves. Death as instantaneously follows when the first or second cervical

vertebra is fractured, and the patient does not long survive wounds of the carotids and internal jugular veins ; but a soldier, horse, or any other animal, often drops dead without a struggle when shot through the neck, although there may be no bleeding, and evidently no injury to the spinal marrow.* Wounds of the pharynx, larynx, trachea, and œsophagus, are generally mortal sooner or later ; and injuries of the carotids are for the most part so : but hæmorrhage may be arrested, and the patient's life saved, by the timely assistance of the surgeon, and the deformities and contractions that are wont to follow may be in great part prevented by his judicious care. Beyond this there is comparatively little to be done.

It occasionally happens that exfoliation of bone follows gun-shot wounds of the neck, (as, indeed, is the case in all parts where bones are concerned,) from the ball having injured one or more of the processes which proceed from the lower cervical vertebræ. They are troublesome cases ; seldom recover without the loss of the power of motion, and often terminate fatally

* We have ourselves killed a tiger of the largest size, with a single ball, in the manner spoken of. In this case there was slight venous hæmorrhage only. We killed, also, a large wolf in the same way. In both cases the animal did not move a limb after being shot. The tiger will often require a dozen or more bullets to bring him down ; and he does not, even then, immediately die. We have seen one fight desperately after having been shot through the heart.

when recovery appeared certain. We must here endeavour to facilitate exfoliation of bone, to support the patient's strength, and to prevent extensive contraction. In all operations about the neck, it should ever be remembered that too much care cannot be taken in avoiding as much as possible the important vessels and nerves which here abound. Make all incisions parallel with the course of arteries, veins, and muscles; and do not on any account apply ligatures to veins, which is very injudicious practice, as we shall hereafter show.*

GUN-SHOT WOUNDS OF THE THORAX

Come next in order: they form an important subject for consideration, and we can scarcely too diligently study them. From the nature of our work, we cannot stop to take a very lengthy view of these cases; but the important viscera contained within the thoracic cavity, their variety and delicacy of structure, together with their pre-ceminently physiological importance, pre-emptorily demand our attention; and although in a

* When breaching the town of Mooltan we were watching the effects of our shot from a small window, with an European soldier, who, in the act of firing his musket, was struck in the neck by a ball, which divided the left carotid, and passed downwards into the chest. There was a tremendous flow of blood, which we succeeded in stopping by pressure, and sent the patient in. He died some days after.

great majority of cases death is the result, still there remains much for the surgeon to do, and many come within his powers of restoration.

When the chest has been perforated by a ball, extreme collapse is the immediate consequence. The natural temperature of the body speedily falls; the pulse sinks, and becomes lost; the face portrays great distress; respiration becomes more and more laborious; and dissolution quickly ends the painful scene. If the heart or great vessels be implicated, death is inevitable. When both lungs are shot through, and the missile passes near their roots, little time remains to the poor soldier. When one lung is traversed, and distressing dyspnoea is accompanied with copious hæmorrhage, the patient's days are few; and when the case is but relatively slight, the bullet passing through an apex of a lung, and out, without injury even to bone, he has not, perhaps, many days to live, as inflammation and its consequences may perchance follow,—leaving the individual scarcely a chance of recovery.

To all of these, however, (omitting one,) exceptions are not uncommon; and we happily witness perfect restoration to health from wounds whose first aspect gave no room to hope.

When both lungs are traversed, and the patient does not immediately die, our most energetic measures are to be used in arresting hæmorrhage, which is most often fearful; to relieve the distressing respiration, and to maintain the natural warmth and powers of the system.

At the same time we endeavour to ward off inflammation, and its subsequent effects.

If a patient happily recover from such a wound as this, he will necessarily be more or less troubled for an uncertain period with shortness of breath,—a slight cough, perhaps, and he will most frequently be unfitted for the duties of a soldier.

When one lung is wounded, the symptoms are dangerous or otherwise according to the position. When high up near the apex, the prognosis is favourable, and there is commonly little bleeding; when lower down, and amongst the larger trunks of vessels, the prognosis must be bad and the hæmorrhage great; and when in the base of the lung, although the discharge of blood is small, and not much dyspnœa present, still there is great danger of fatal consequences from subsequent inflammation. The flow of blood into the air-cells or into the pleural cavity, the former creating a serious obstacle to the aeration of blood, and the latter tending to inflammation, will require our best remedial measures, and admits not of delay. In these, little or no blood escapes by the external wound, but it is coughed up in florid streams, often apparently flowing from the lungs in a continuous current, which nothing but death itself can arrest, and the hapless patient dies from loss of blood. In some cases there is no external evidence of hæmorrhage, but the dyspnœa, already very distressing, becomes every instant more and more so,—which, together with the rapidly falling pulse, are proofs sufficient of fatal bleeding within.

The external position of the wound, or wounds, will not often, or perhaps ever, give us a correct idea of the course the ball has taken in traversing the thoracic cavity. For example, the bullet enters at the upper part of the chest on the left side, and the right lung is wounded at its base. Or, perchance, the ball goes in just above the diaphragm on the right, and escapes just below the clavicle on the left.

Indeed, the musket, rifle, or pistol bullet, except when discharged close to its victim, seldom takes a direct course through a cavity. So it is that the aperture of egress bears no relation to that of ingress. No rule, consequently, can be laid down, with a view to the finding of these extraneous bodies. It is a matter, however, of comparatively small importance, as the mere extraction of the ball should not even be thought of as long as symptoms fraught with instant danger to life remain unrelieved.

It will be seen, (when we speak of treatment,) that the practice of probing and searching for bullets is by no means desirable, and that it is in all truth the last curative measure to be adopted. We have before noticed, and shall again and again have occasion to recur to, the extraordinary routes balls take in their passage through living tissues; sometimes flying off at right angles, at others taking a semicircular course, now and then making a complete circle, and often following a zig-zag direction. When we meet with cases such as these, it is not by any means easy to say how they happen. The sharp edge or angle of a bone,—the tough smooth

fascia of a muscle,—a button or a coin,—the position of the body,—the shape of the ball, whether it be round or rimmed,—and the distance from whence discharged,—are all assigned as reasons. Nevertheless they do not satisfactorily explain the matter; but it is sufficient for our purpose to know that such cases are common, and satisfactory inasmuch as when these important cavities are concerned, life is more often saved than lost by this erratic property of musket and rifle bullets. In those well-authenticated cases of recovery from gun-shot wounds of the thorax, where apparently the ball has passed directly across the chest, going in on one side and escaping at a corresponding spot on the other; or, perhaps, passing from before backwards, or from above obliquely downwards, and vice versâ,—in all these cases we say that recovery is more or less favoured by deviation of the missile from the direct course. It is true enough that many patients recover where both lungs have been perforated, and more often one lung only being shot through, as we have had cases sufficient to prove: but we repeat that in the majority of those examples where it is said “these patients were shot clean through the *lungs*,” that it would be more correct to say that they were shot through the *chest*,—the viscera having escaped in consequence of the ball having taken a circular course upwards, downwards, or laterally.

Our treatment of all gun-shot wounds of the chest must be antiphlogistic and palliative, and the cases may

be left as much as possible to the *ars medendi naturæ*, so long as she is able to act. Where, however, the *ars hominum* is necessary to the ease, it must be used vigorously, and steadily continued until the desired effects are well produced.

GUN-SHOT WOUNDS OF THE ABDOMEN

Are ultimately more serious, on the whole, than those of the thorax. The reasons are obvious. In our own practice, throughout the late war, not one case recovered where the abdomen was fairly shot into, and the small intestines wounded :—at least, we do not recollect an instance. It is quite possible, however, that some did get well without our knowledge, as we were obliged to leave many cases completely in the hands of the apothecaries* and native doctors, who not unfrequently neglect to report the results. Occasionally, nevertheless, recovery does follow a wound of the abdomen where the intestinal tube has itself been injured. The chance of escape will be more or less likely according to the part of the gut shot through. Now and then complete recovery is the result, even where the upper part of the stomach is perforated ; and, according to some of our contemporaries, there are soldiers now living whose

* The apothecaries in India are warrant officers, and educated in the country.

stomachs have been shot through from before to behind. We must not, however, forget what has repeatedly been said as to the aptitude of balls to pass from the direct course. It is possible for a bullet to pass in at the scrobiculus cordis, and out again at the back, without being fatal. It is not only possible, but by no means uncommon, for wounds of the colon to heal completely ; but bullet wounds of the jejunum or ilium are ninety-nine times in a hundred mortal. In those solitary instances of recovery where no external opening remains, we are apt to doubt the intestine ever having been wounded. Where a fistulous opening remains connected with the bowel, it can scarcely be called a recovery ; although life (hardly desirable) is still the unhappy patient's. Military surgeons nevertheless tell you that recovery is not uncommon, and they will give you unquestionable examples. As long as there is life we should hope, and fail not to use those palliative means which are clearly pointed out. We must not, however, forget that much meddling will assuredly prove fatal here ; and therefore it is better not to interfere, but leave the case to nature. She will sometimes cure where art can only kill. Occasionally a ball passes through the belly without injury to its contents. Sometimes it sweeps round the abdomen without wounding the intestines or peritoneum ; at others (especially in very fat persons), the shot perforates the integuments and adipose tissue only, remaining imbedded therein, or, traversing it for some distance, escapes without doing further mischief. It may, how-

ever, re-enter the body and prove fatal, or, taking an upward or downward course, become lodged in a limb.*

When the liver is shot through, the case is truly desperate. Together with ordinary symptoms of gunshot wounds of the abdomen, there will be more or less external or internal hæmorrhage: the latter indicated by rapidly sinking pulse, and speedy dissolution. In a very great proportion of these cases death soon follows. All our efforts must here tend to arrest hæmorrhage. The most profound quietude and rest must be enjoined, if we would hope to save life, or even to prolong it for a very limited period. In no case that I am acquainted with is the presence of the medical officer so much needed. To give the patient one single chance, it is absolutely necessary he should be seen upon the field, on the very spot where the fatal bullet strikes. To convey him to the hospital, or to carry him any distance, is tantamount to killing him. He will not reach the first alive (we know of no example); the last he will not long survive.

Much the same may be said of wounds of the spleen; they are not so fatal as the last, perhaps, and not so common. Simple injuries of the spleen are not often

* In the battle of Suddozam, a soldier was struck by a small bullet, just above the right anterior-superior spine of the ilium. The ball passed round the trunk, entered the abdominal parietes on the left side, then passed downwards through the scrotum, and at length contented itself with remaining in the left nates, from whence I removed it. No bad consequences followed.

met with. They are generally complicated with lesion of neighbouring structures.

Wounds of the kidney scarcely come under the control of the surgeon. They are probably almost always fatal, inasmuch as inflammation of the most destructive character quickly follows, from extravasation of urine into the peritoneal cavity, or into the neighbouring areolar tissue. If this does not prove fatal, the whole system soon becomes affected by the admixture of urea with the blood, and death by syncope follows.

If the bladder be wounded, particularly at its base, there is no great reason to hope. When above anteriorly, and early detected, the patient may get well provided he be kept in a proper recumbent position, and kept there.

The penis and the scrotum are very frequently the seat of gun-shot wounds: they occasion severe irritative fever, and distressing mental impressions. They are not, nevertheless, often dangerous to life.

GUN-SHOT WOUNDS OF THE EXTREMITIES.

We have more to do with these practically than with any of the foregoing, for this simple reason, viz. they are not often instantaneously fatal. It is hardly correct to say they are ever immediately fatal, but the patient soon dies after the division of the femoral artery by a shot. Generally (if the surgeon be present), ample

time is given for the application of remedies, which is unhappily not the case with the foregoing forms of gun-shot wounds.

The symptoms attendant here are commonly identical with those of cannon-shot and shell wounds,—except, of course, in degree. It is worthy of notice that in the very simplest kinds of gun-shot wounds (and that, too, when least expected), we often meet with alarming constitutional disturbance, such as extreme depression and general prostration, or perhaps great mental alarm and excitement. Sometimes we find little or no pain, and trifling hæmorrhage; at others much suffering is evinced, and very considerable bleeding present. We noticed in the case of two officers (wounded in the first advance on Mooltan, one in the ankle-joint, the other in the thigh),* the most singular symptoms of cerebral disturbance, indicated by periodical loss of memory, incoherent mutterings, and craving for some particular food or medicine. In one case, pus formed in the smaller joints, and the patient died; in the other, no apparent reasons could be detected. The wound healed most favourably from the first, and recovery was complete. We have noticed also similar abnormal conditions amongst the wounded sepoys, sometimes remaining to the end, or coming and going at regular intervals. Derangement of the abdominal viscera is by no means uncommon, appearing in the form of dysentery, diarrhoea, and even hepatitis. These are most

* Major Lake and the late Lieut. Christopher.

unfavourable concomitants, often fatal to the welfare of the cases, and always difficult to deal with. They must be met with the most active and approved measures for their removal. They may be called traumatic,—not that they differed in any way from ordinary forms of these diseases, but that they were solely attendant upon wounds. I lost several patients from these causes during the war, and that, too, when there was scarcely a simple case of dysentery or diarrhœa in the whole force under my charge.

It will be remembered we mentioned that cannon-shot wounds of the extremities were more noxious to life in an inverse ratio to the velocity and impetus of the shot. Those remarks will not apply to musket and pistol-ball wounds. It is apparent, in these cases, that according to the velocity and momentum of this small missile so will the amount of danger and severity be. It is not easy to estimate the amount of force necessary to propel a bullet directly through a limb, so that the apertures may be diametrically opposed to each other. Neither can we lay down any rule by which to determine the severity of a wound by the distance from whence the bullet is discharged; this must necessarily be much modified by the kind of firearm used, by the size of the ball, the length of the barrel, and the charge of powder. We may, however, by way of example, suppose that a musket-bullet discharged at the distance of a hundred yards passes clean through the thigh, fracturing and comminuting the femur; at three

hundred and fifty yards it passes into the thigh, strikes upon the bone, and remains flattened near it ; producing, indeed, a very severe injury by contusion of periosteum and bone, but without fracture. At six hundred yards or more, the missile perforates the skin only, being turned from its direct course by the fascia lata, and you find it lodged immediately underneath the integuments at the posterior aspect of the thigh. It may perhaps enter the flesh, and you find it, by a little manipulation, on one side or the other of the external wound ; and, lastly, being nearly spent, it bruises only, occasioning a sharp stinging sensation, sometimes producing considerable swelling, at others only raising a trifling bleb.

CHAPTER III.

GUN-SHOT WOUNDS OF THE EXTREMITIES—*continuea*.

WE have already said these injuries will be more or less dangerous according to the charge of powder used, and the distance from whence the bullet comes, particularly according to the part of the limb, and more so still according to the nature of the structure injured.

When the shoulder is the seat of injury, the prognosis is for the most part bad. The bones are generally fractured into many pieces, perchance both above and below the joints. Perhaps the bullet lies imbedded in the joint itself in one articulating extremity, or, having sufficient momentum, passes through. If the shoulder be shot clean through, and the bones much comminuted, the surgeon must duly consider the propriety of operating. If he determines to save the limb, he must be prepared for severe constitutional disturbance and considerable local inflammation, together with very copious exhausting suppuration. If the hip-joint, or the parts about, be wounded, the constitutional symptoms run high, and the prognosis must be guarded. Commonly the bones of the pelvis are also concerned,

which increases twofold the danger : palliative remedies only are admissible here.

When the shaft of the femur is fractured and (as almost always happens) comminuted,—when the humerus is broken,—or if the brachial or femoral artery, or femoral vein be divided,—the case admits of no delay ; the surgeon must quickly determine the course he will pursue. If the thigh-bone, or any other bone, be violently struck by a ball, but not broken, the danger to life is, nevertheless, often great. Periostritis, and inflammation of bone itself, are wont to ensue, with a formidable train of symptoms difficult to remove ; and, although the hapless patient lingers many months, he dies at length worn out by the discharge of pus. Again, when the elbow, knee, or ankle-joint, is shot through, the medical officer's most serious consideration is needed. His first care is to save *life*, his next to save the limb. If he attempts the last, he must use his best endeavour to render it useful. Indeed, the chances of its being ultimately serviceable to the soldier must have great weight in his primary decision.

Wounds of the fore-arm and hand, leg and foot, are very common. They do not militate against life in any comparison to the last. They are, however, sufficiently formidable and troublesome. They need much care when the arteries and veins are wounded, and when the bones are extensively comminuted.

PUNCTURED WOUNDS

These comprehend all those injuries produced by the thrust of the sword, lance, bayonet, or any other sharp-pointed instrument; and they form a very important class of wounds. They are not so formidable in appearance, or so alarming to the patient, as many of the foregoing lesions; and they do not so immediately arrest the attention of the medical officer. The symptoms attending them are identical with those of gunshot wounds in general, but they are not always so pressing. Nevertheless, they are (particularly when situated in the thorax or abdomen,) as fatal to life, perhaps more destructive, (excepting always cannon-shot wounds,) than any other class of injury to which the soldier is obnoxious. So deadly, in fact, is the thrust of the sword, that the soldier speaks well in saying,—“I would rather a *dozen* cuts, than *one* prick from the point.” The fatality of incised wounds bears no adequate comparison to the punctured. The former cannot strictly be considered fatal injuries; the latter are pre-eminently mortal wounds, and for the most part admit only of palliative remedies. We may here remark how desirable it is that every soldier should know this, and be taught to use the point on every possible occasion. Few men (no matter how great the excitement,) are able to continue the fight many moments after having received a thrust in the chest. The shock to the whole system is so great that he soon falls fainting to the

ground: not so, however, when wounded with the edge,* for it is common to see the soldier continue the struggle, fight desperately for some time, and even to kill his antagonist, after having been thus mortally wounded. No officer that has any command of his weapon will think of hewing with the sword, when he is aware how much more fatal and formidable the point is,—and how much superior it renders him to an enemy who from the curved nature of his weapon can only cut with the edge.

Exceptions.—The immediate effects of punctured wounds upon the general system, although they be identical with the lesser gun-shot, (as we have before said,) are not always so instantaneously prostrating; the wounded man does not so readily succumb. If even the abdomen be the seat of mischief, it not unfrequently happens that the soldier remains upon the field and delivers his fire for some time, scarcely noticing the wound that is inevitably mortal. When the chest is thrust into, and one or more of its important organs wounded, an instantaneous sense of suffocation follows,

* In storming a mosque (the Jogmia,) in the first siege of Mooltan, Lieut. Richardson, of 49th N. I., burst open a door, and rushed sword in hand into a house out of which the Sikhs were firing with great effect upon our men. He defended himself for some time against odds, but being surrounded, and in great danger, he passed his sword through the nearest Sikh, and, seizing his dying enemy in his arms, retreated towards the door, covering himself with the body, and at last succeeded in reaching it,—but not until he had received *ten* sword cuts in his head, trunk, and limbs. He completely recovered.

which death itself alone relieves. If the cavity of the chest alone be entered, without any damage to its viscera, dissolution is often no less sure,—air rushing in, sometimes fills the pleural cavity, putting a period to the process of respiration, and death by asphyxia is the result. In the great majority of these cases the prognosis must needs be extremely unfavourable, and we are compelled to be guarded in our conclusions respecting the whole of them.

If, perchance, the neck be thrust through, it becomes the surgeon's duty (before he determines on his course,) to ascertain, as far as may be, what structures are implicated: his prognosis will be regulated accordingly.

Much manipulation or meddling in any way will assuredly prove detrimental, whether the wound be in the neck, chest, or belly; so, therefore, it must be guarded against, and the strictest quietude enjoined.

There are living examples of recovery from the severest kinds of punctures, even from wounds of the abdomen, the intestines themselves being perforated and torn; but, alas! these happy results are very few. In ninety-nine cases to one, the bowel being fairly opened and some of its contents let out, death will follow; and it is hardly too much to say that all bayonet, lance, and sword wounds of the belly are deadly.

It is scarcely possible for the abdominal viscera to escape if the peritoneal cavity be fairly entered by such weapons as these. It is by no means the same here as in the case of the musket-bullet;—this, from its great velocity, appears now and then to pass completely

through the body, without having, as it were, time to do mortal damage ; not so with the bayonet, sword, or lance, for each and all carry death on their points.

Of the treatment we shall again speak at length ; for the present, let it never be forgotten that rest is all in all to the poor patient, and that purgatives (indeed *all* medicines, with the exception of opium) are poison itself.

PUNCTURED WOUNDS OF THE EXTREMITIES.

We need hardly say that these are not so important as the last. Oftentimes, it is true, they give trouble enough, and if arteries or deep-seated veins be concerned, they demand immediate attention, and great care in the application of our remedies.

If operations be called for, no time should be lost : medicines must be very cautiously administered, and never without some sound reason. Tetanus will occasionally follow, no matter however good our preventive measures may be. When it unhappily presents itself, the strongest palliatives are alone to be resorted to.

INCISED WOUNDS

Are usually attributable to the sword in the field. In Indian warfare they are exceedingly common, but not by any means proportionably destructive of life. They are now and then desperate injuries, but on the whole

may be viewed as the simplest and least dangerous forms of wound we meet with. The treatment relating to them is generally the simplest too; nevertheless, the surgeon is not on this account in any way exonerated from giving them his best attention. His judicious care is most salutary; in truth, his services cannot be dispensed with, as they are essential to the speedy healing of the cut, and to the formation of sound cicatrices. We have said that the treatment is very simple in these instances,—too simple it cannot be; and that surgeon will do by far the best who accustoms himself to the use of the fewest applications. As regards the danger of incised wounds, much will (as in all other cases) depend upon where they are, their depth, and more particularly their direction. Where they follow the course of muscles, arteries, and veins, the prognosis is commonly most favourable, it matters not however extensive they may be.*

Incised wounds may extend from the shoulder-blade to the sacrum, going down to the bones, or perchance from the hip to the knee, laying bare the femur. A

* The day after the battle of Suddozam, a Sikh was brought in who had remained upon the field all night. He had upwards of a dozen sword cuts in his head, trunk, and limbs. Together they measured more than two yards; some of them were two and three inches deep, but chiefly longitudinal wounds. This man completely recovered, and returned to the enemy. In contradistinction, about the same time I admitted a soldier with a wound in the calf of the leg, running across and down to the bone. Notwithstanding the best that could be done for him, he died in three days.

great gash in the leg, running from the popliteal space to the heel, is common, through which with the finger you may reach the interosseous membrane. Sometimes the belly is laid open to the extent of ten or twelve inches, and occasionally the intestines protrude, and yet death may not follow. There appears, indeed, to be no limit to the extent of sword cuts from which the patient may not recover, provided ever that the incisions take the direction of the muscles and larger vessels. When they follow a transverse course the case is wholly different, and the prognosis is in every instance unfavourable. Happily, transverse wounds of this kind are for the most part found on the external aspect of the limb: for example, on the outer side of the arm, thigh, or leg. On the contrary, if they happen on the inner side and behind, the brachial artery and vein, the femoral artery and vein, or the popliteal artery, or the posterior tibial, with some of the larger nerves, are generally divided, so that (the wound not being apparently dangerous,) it becomes the surgeon's duty to apply a ligature, or amputate, or at least to explain clearly the danger to his patient, who, being ignorant of the nature of the wound, will not readily believe that, to save life, he must lose a limb. During the late war I lost many patients who, having been wounded by the sword in their legs, would not submit to amputation. Indeed, I found it impossible to assure them of their danger; consequently they died of mortification or exhaustion.

It is a most painful duty on the part of the medical

officer, (when called to such cases as the above), to propose amputation of an extremity, when there is no *apparent* danger to life or limb. It is, however, to the nature of the structure injured, and not to the extent of the wound, that the experienced surgeon looks; and he will not be many moments in determining what must necessarily be done. We need hardly say, that in all cases of incised wounds it is impossible to take too much pains in dressing them the first time; neither can we too soon give them our attention. The reasons are obvious, as we shall hereafter show in treating of special cases.

SIMPLE AND COMPOUND FRACTURES. *

Of these it is not necessary to say much generally, as they differ in no respect from those examples which are daily met with in our hospitals and in private practice at home. In all armies marching in the field such cases are constantly occurring. They are commonly produced by falls from horseback, by the wheel of a gun-carriage passing over a limb, and by the contact of expended round-shot, &c. &c.

As regards the treatment of these cases it will be necessary to speak at some length, as we have to adapt our means to place and time, and often to have recourse to expedients which would not be admissible or eligible under more favourable circumstances.

DISLOCATIONS AND SPRAINS

Need not be spoken of at length in this place. Where the former are complicated with fracture, (which is by no means uncommon in every campaign), they give no small trouble to the medical officer, who, from want of sufficient apparatus, is often put to all kinds of shifts to meet the exigencies of the case. The very earliest consideration is here demanded,—no time must be lost; a delay of minutes will always increase the difficulties—often render them insurmountable.

Bad sprains too should never be neglected, as the pain attending them is very great; extensive swelling soon appears, with effusion and extravasation of blood, which (should fracture accompany the lesion) will render the detection difficult, and now and then impossible.

There is a kind of sprain or strain of the joints, particularly of the shoulder-joint, often met with in field practice, especially after a cavalry charge, which presents many untoward symptoms: it is a violent stretching or laceration of ligaments and tendons. It is occasioned most commonly by desperate hewing with the sword, especially if the soldier misses his object. Indeed, the humerus is often dislocated by striking furiously backward with the sabre, capsular ligaments being torn, and pieces of bone itself detached.

Here again the surgeon's ingenuity and skill are much needed in adapting his bandages, splints, &c. The

welfare of the patient will mainly depend on his success in meeting the exigencies of the case.

CONCUSSION AND COMPRESSION.

With concussion and compression of the brain the military surgeon has much to do, as examples are very common in every battle. They are of all degrees of severity, from the instantaneously fatal, to those from which (after a short period of stupor) the soldier soon permanently recovers. They are occasioned by spent-shot of all kinds and sizes, by blows of the sword or clubbed musket, and by falling from horseback. Considerable numbers of men are killed in every battle by simple concussion of the brain, and we have failed to find any external signs of injury; commonly the nature of the lesion is sufficiently clear, and the deep-seated mischief may be fairly judged of by the same. It is well to remark, that, during every charge of European horse, many of the enemy are killed by simple concussion produced by a blow of the sword which does not even touch the scalp.

The English dragoon-sword is so blunt that the strongest man cannot drive it through the head-dress of a Sikh or Afghan; nevertheless, the enemy is most often beaten from his horse, and frequently killed by the violence of the shock. Not so, however, with the trenchant blade of the Sikh; this weapon, wielded by a strong man, will cut through any head-piece, and bury

itself perhaps in the brain, and yet you find no symptoms of concussion or compression ; in the former example the soldier is effectually disabled,—often killed outright. In the latter, although the individual is mortally wounded, he may be able to continue the fight, and even to kill his antagonist, before he falls himself dead, or dying, from his horse.*

In this place, with respect to treatment, it is enough to say, (and we insist upon it the more particularly as the apothecaries and native doctors are wont to be very officious,) that the surgeon cannot too strongly enjoin quietude, nor too positively forbid all meddling and handling on the part of his assistants.

* When we were lying before Mooltan one morning, two men were brought in desperately wounded. It appeared that, during a quarrel, one who was on horseback suddenly rushed sword in hand upon the other, and with one blow of his tulwar (sword) laid open his skull to the extent of six inches, deeply wounding the brain : notwithstanding this mortal wound, the foot soldier drew his weapon, attacked his enemy, beat him from his horse, wounded him in six places, laid him at his feet, and then fell prostrate by his side. The first wounded man died in half an hour,—the last recovered in six months, and I discharged him a cripple.

PART II.

TREATMENT OF WOUNDS.

GENERAL VIEW.

I PROPOSE to offer a few general remarks concerning the *modus medendi* of all lesions of the human body—no matter whether they be small or great—no matter whether they befall the soldier in the burning plains of India, or in the cool and healthful fields of France. No matter, I say ; for surgery is one and the same thing, whether it be practised in the torrid, frigid, or temperate zone.

The means to ends are some what dissimilar, no doubt. Medicines differ, instruments differ, and so do doctors,—all things differ, and doctors more than all. Nevertheless, if men be honest, (honest they can be in the Army,) their differences cannot, will not, prevent their reaching one and the same goal. That goal is, to save man's life, to save the members of his body, and to restore them in all their integrity to the performance of their natural functions. To this great end all our energies should tend, let the route be what it may—either direct, circuitous, or zig-zag.

He does best who goes straight onward to his object, using the simplest and fewest means by the way:

Let these means be what they may, before all things it is necessary (ere the surgeon enters on the field of practice) that they should be so arranged as to be ever present to the hand, and, according to their nature or purposes, as good and as serviceable as circumstances will permit.

Of special medicines and prescriptions we have nought to say (we shall give our own forms as we pass); every medical man has learned to give preferences, both to medicines, instruments, and appliances,—experience is his safest guide; but we cannot too strongly recommend the most simple forms of treatment, and we protest against all kinds of complicated apparatus. They never answer well, even in our best regulated hospitals at home. They are mostly more than useless in the field of battle, and not unfrequently highly injurious. The same may be said of numberless instruments; they are doubtless very serviceable in their way, and they are unquestionably very cleverly constructed. They are pretty, too, and apt to take the fancy, particularly of subordinate medical officers, who seem to think they can scarcely have too many machines in use. For our own part, we have considerable confidence in our fingers, having had occasion to make pretty considerable use of them during the late war. Our practice apparently far exceeded our means, but it was more apparent than real; for we do not remember that our cases did one jot the less favourably than those that are attended by all the most approved remedies that the ingenuity of the age can produce.

Of remedies, both external and internal, we can hardly have too few. It is quite true that similar medicines will not always answer in similar cases, and there are no such things in nature as specifics. Nevertheless, the surgeon may select from that host of officinal drugs a few which will amply meet the exigencies of every ordinary case.

It is not necessary that the medical officer should confine himself to any given remedy or remedies; neither is it by any means desirable for him to ride a hobby hard,—he will find him hard to manage if he does. No, no: let him be liberal in his sentiments, and likewise let him be liberal in his means, but at the same time let his *modus applicandi* be simple, and as good as his intentions,—which are, namely, to do his duty faithfully, and alleviate the sufferings of his fellow-men.

Individually, I would advise every military surgeon to carry about his person, or at his saddle, a small pocket-case, a few yards of bandage, and some large cord silk: if possible (particularly if he advances far into the field,) he should take an opiate, and some strong compound of ammonia. He should never fail to fill his holsters with such things as are capable of saving life, or of prolonging it. If he must needs have a pistol, let him carry it in his belt; we would not recommend his going without one, particularly if he be attached to irregular troops: but we would have him suspend it round his waist; the very fact of its being there is his best protection, and he will assuredly find his holsters

more useful as receptacles for little matters immediately connected with his duties.

In his treatment of wounds, (whether they be lacerated, punctured, incised, or contused,—whether they be small or great, whether they militate against life or not), that medical officer who wishes to relieve suffering, and to give his unfortunate patient a fair chance of recovery, will not fail in his endeavours to secure the following adjuvants, without which (no matter however skilful he may be in every branch of his art,) his measures will assuredly fail, or at least answer but feebly his expectations and wishes.

Firstly, then, let his temporary hospital be situate in an open space, and as near water as possible. Let there be an abundance of light, and a free access of air. When there is much prostration and collapse, too much light cannot be admitted. Next to pure air itself, a bright light (not the sun's direct rays,) is one of the most powerful stimulants. The production and maintenance of sufficient warmth follow in importance. It is a very potent vital stimulus. Lastly, a plentiful supply of moisture must (especially in the torrid zone,) be provided both in the air, and as a local application.

Thus, then, pure air, and light, heat, and moisture, stand first as necessities, and the following are scarcely less desirable,—viz beds as large as may be, profound mental and bodily rest, pans and vessels, with the strictest cleanliness. Let the wounded men be separated as much as possible from each other, and those that

suffer from similar diseases or injuries should be set completely apart.

The wounded soldier's diet needs attention, too; it will not admit of neglect. We allow that circumstances are against us here; but when are they not against us in the field? If we cannot do as well as we wish, let us not fail to do as well as we can. We can often do a great deal—always more than at first appears possible, of which I had sufficient proof during the time I had charge of a large army, (18,000 men,) and when the whole of the enemy's wounded were made over to me at the siege of Mooltan.

A few things still remain to be noticed,—a general rule or two laid down (homely although they be,)—before we actually proceed to practice. They are, viz.—

Position in operating.—The surgeon should generally stand on the sight side of the patient, being careful not to rest against him.

Assistants engaged in supporting the patient should keep close to his person, and as much as possible out of the operator's way.

Tourniquets.—Two tourniquets should always be at hand. In *all* amputations on the field apply a tourniquet, otherwise blood will be lost by the smaller arteries.

Circumference.—The circumference of a limb about to be amputated should be taken by grasping it with the hands, in order to estimate its diameter.

How to hold a limb during amputation.—The assistant should grasp the limb firmly with both hands,

holding it steadily in position. The surgeon himself must with his left hand depress or elevate as occasion may require.

How to hold Instruments.

Amputating Knives.—The amputating knife should be held between the thumb and fingers ; its handle should be free of the palm.

The Saw should be worked in a horizontal line, and grasped with three fingers and the thumb ; the forefinger being thrown out, as in indicating, by the side of the handle.

Scalpels and Bistouries should be held between the thumb, index, and middle fingers.

Probes, Sounds, Catheters, Artery-Forceps, Needles, &c., &c., should be lightly held between the index finger and thumb.

Sutures should be rather too large than too small ; should pass only through the skin.

Apparatus and Appliances, when they give much pain, should be removed, changed, or re-adjusted.

Bandaging.—To bandage well is only to be acquired by practice. The apothecaries *generally*, in India, and the native doctors *always*, bandage very badly. In every case bandage towards the centre of circulation, and somewhat lighter as you ascend, taking care not to crease the skin.

Bleeding should be continued until some decided effect is produced, but not to complete syncope. The patient should be either standing or sitting.

Calomel is without doubt the most useful of all remedies. It is common to give twenty or thirty grains at a time in India. I believe ten grains to be the proper dose, and six generally sufficient.

Opium differs in strength and purity in every climate ; it is not the same in every shop. Its influence upon the patient is to be carefully watched, and the dose regulated accordingly.

Marching.—The wounded should be dressed, or at least examined, before leaving the old ground, and after they reach the new.

Wounds.—When in doubt as to the propriety of operating in case of wounds, being on the march should determine in favour of the operation.

Formulæ.—I have no hesitation in recommending the following formulæ for the preparation of medicines in field practice :—

PILLS.

F. 1. *Common Purgative Pills.*

R Pulveris Scammonii,

———— Cambogiæ,

———— Rhei,

Saponis Duri, aa. ʒj.

Extracti Colocynt. Comp. ʒiv.

Olei Carui, fʒj.

Misce fiat Massa, gr. x. vel xx. pro dosi.

F. 2. *Calomel Purgative Pills.*

R Hydrarg. Chloridi, ʒij.
Extracti Colocynth. Comp. ʒj.
Olei Caryophilli, mxx.

M. f. Massa, gr. x. vel xv. pro dosi.

F. 3. *Mercurial Alterative Pills.*

R Hydrarg. Chloridi, gr. xij.
Pulveris Ipecacuanhæ, gr. xx.
Extracti Conii, gr. x.

Misce fiat Pilulæ, xij. : j. vel ij. pro dosi, nocte
maneque.

F. 4. *Mercurial Alterative Pills.*

R Hyd. Chloridi, gr. xij., vel
Pilulæ Hydrarg. gr. xxiv.
Pulv. Opii, gr. vj.

Misce bene et divide in Pilulas vj. : capt. j.
nocte maneque.

F. 5. *Mercurial Alterative Pills.*

R Pilulæ Hydrarg. gr. xxiv.
Extracti Hyoscyami, ʒij.
Pulveris Ipecacuanhæ, gr. xx.
——— Zinzib. gr. x.

M. f. Pil. xxiv. : capt. j. bis die.

F. 6. *Diaphoretic Narcotic Pills.*

℞ Hydrarg. Chloridi, gr. xxxvj.

Antim. Potass. Tartratis, gr. v.

Pulveris, vel Extracti Opii, gr. ix.

———— Ipecacuanhæ, gr. xvij.

Mucilaginis Acaciæ, q. s.

Misce bene, et fiat Pilulæ xxxvj. : j. nocte mane-
que, vel sextâ quaque horâ.

F. 7. *Antihæmorrhagic Pills.*

℞ Plumbi Acetatis, gr. xxiv.

Pulv. Opii, gr. xij.

———— Ipecacuanhæ, gr. xxiv.

Ext. Hyoscyam. ʒij.

Misce et divide in Pil. xxiv. : capiat unam quartâ
quaque horâ, cum haustu F. 16, sine Plumbi
Acetate.

F. 8. *Antispasmodic Pills.*

℞ Assafoetidæ, ʒij.

Camphoræ, ʒj.

Pulveris Opii, ʒss.

———— Zinziberis, ʒj.

Spiritus Menthæ Pip. q. s.

Misce fiat Massa gr. v. vel x. pro dosi.

F. 9. *Tonic Pills.*

℞ Quinæ Disulphatis, gr. xxiv,

Ferri Sulphatis,

Pulv. Zinziberis,

Extracti Aloes, aa. gr. xij.

Misce fiat Pilulæ xij. : capiat j. vel ij. ter die.

MIXTURES.

F. 10. *Strong Stimulating Mixture.*

℞ Spiritûs Ætheris Sulph. Comp. f℥j.

———— Ammon. Aromatici, f℥ij.

———— Cinnamoni, f℥iij.

Misturæ Camphoræ, Oīss.

Misce fiat Mistura, ℥iss. vel ℥ij. pro dosi.

F. 11. *Antispasmodic Mixture.*

℞ Tincturæ Assafoetidæ, f℥j.

Spiritûs Ammon. Aromatici, f℥iss.

Tincturæ Opii, f℥ij.

Aquæ Menthæ Piperitæ, Oj.

Misce fiat Mistura, ℥iss. sumantur pro re natâ.

F. 12. *Purgative Mixture.*

℞ Magnesiæ Sulphatis, ℥viij.

Infusi Sennæ, Oij.

Tincturæ Sennæ, f℥iv.

Spiritûs Carui, f℥iij.

M. f. Mist. ℥ij. vel ℥iv. pro dosi.

F. 13. *Purgative Mixture.*

℞ Magnesiæ Sulphatis, ℥xvj.

Magnesiæ Carbonatis, ℥ij.

Spiritûs Carui, f℥j.

Aquæ Menthæ Piperitæ, Oīij.

Misce fiat Mistura, ℥ij. vel ℥iv. pro dosi.

F. 14. *Purgative Antihæmorrhagic Mixture.*

℞ Magnesiæ Sulphatis, ℥j.
Sodæ Sulphatis, ℥j.
Vini Ipecacuanhæ, f℥ij.
Acidi Sulphurici Diluti, f℥ij.
Aquæ Puræ, f℥xij.

Misce fiat Mistura, capiat uncias tres quartâ
quaque horâ.*

F. 15. *Saline Sudorific Mixture.*

℞ Liquoris Ammonię Acetatis, f℥iij.
Spiritûs Ætheris Nitrici, ℥iij.
Vini Antim. Potass. Tartratis, f℥iss.
Aquæ Puræ, f℥v.

Misce, capiat cochlearia ampla duo quartâ quaque
horâ.

F. 16. *Antihæmorrhagic Mixture.*

℞ Plumbi Acetatis, gr. iv.
Acidi Acetici Diluti, f℥ss.
Vini Ipecacuanhæ, f℥ij.
Tincturæ Hyoscyami, f℥ij.
Aquæ Puræ, f℥viij.

Misce fiat Mistura. Dosis f℥ij.

* In case of hæmorrhage this is a very useful purgative. I have often taken it myself in consequence of hæmoptysis. The ipecacuanha appears to increase its efficacy.

F. 17. *Antihæmorrhagic Mixture.*

℞ Aluminis, ʒj.

Tincturæ Hyoscyami, fʒij.

Vini Ipecacuanhæ, fʒij.

Aquæ Puræ, fʒviii.

Misce fiat Mistura, capiat cochlearia ampla iv.
sextâ quaque horâ.F. 18. *Nitric Acid Mixture, to relieve Thirst.*

℞ Potassæ Nitratis, ʒj.

Acidi Nitrici Diluti, fʒij.

Syrupi, fʒij.

Aquæ Puræ, Oij.

Misce fiat Mistura. Dosis fʒiv. pro re natâ.*

F. 19. *Astringent Mixture.*

℞ Pulveris Rhci, ʒj.

——— Kino, ʒj.—Θij.

——— Crcetæ, ʒij.

Tincturæ Opii, fʒiij.

Spiritûs Ammonix Aromat. fʒv.

Misturæ Acaciæ, fʒv.

Aquæ Cinnamonî, fʒx.

Misce gradatim et fiat Mistura. Dosis, fʒiss. vel
fʒij. ter quaterve die.†

* I can strongly recommend this mixture when thirst is very distressing, in case of severe injuries. The syrup may be omitted.

† I prescribed this medicine with uniform good effect, in a vast number of cases of simple diarrhœa.

F. 20 *Tonic Mixture.*

℞ Sodæ Sesquicarbonatis, ʒij.

Tincturæ Gentianæ, fʒij.

Infusi Gentianæ Comp. fʒv.

—— Rhei, fʒiij.

Misce fiat Mistura. Dosis fʒiss.

F. 21. *Tonic Mixture.*

℞ Quinæ Disulphatis, ʒj.

Acidi Sulphurici Diluti, fʒij.

Misturæ Camphoræ, Oj.

Misce fiat Mistura. Dosis fʒiss. ter die.*

F. 22. *Tonic Mixture after Hæmorrhage.*

℞ Misturæ Ferri Compositæ, fʒiss.

Tincturæ Aloes Compositæ, fʒss.

Misce fiat Haustus ter die sumendus.

F. 23. *Stimulating Narcotic Draught
for Delirium Tremens.*

℞ Extracti Opii (Hill), gr. ij. vel iij.

Aquæ Ferventis, fʒiv.

Tere in mortaria, et adde

Spiritus Vini Gallici (Brandy), fʒiss.

Sacchari, q. s.

Misce fiat Haustus.†

* In very obstinate agues, and also in exhaustion from sup-
puration, after the medicine has been used for some time, ten
minims of laudanum added to each dose increase its effects, and
allay irritation.

† This draught should be given to the patient in a tumbler,

F. 24. *Anodyne Opiate Mixture.*

℞ Tinct. Opii, fʒij.

Spiritûs Ætheris Nitrici, fʒiij.

Misturæ Camphoræ, fʒxij.

Misce fiat Mistura. Dosis fʒij. pro re natâ.

LOTIONS.

F. 25. *Opiate Lotion for Painful Wounds.*

℞ Extracti Opii, fʒj.

Aquæ Ferventis, Oj.

Misce, et adde post horas duas

Spiritûs Vini, fʒj.

Fiat Lotio.

F. 26. *Refrigerant Lotion.*

℞ Liquoris Plumbi Diacetatis, fʒj.

——— Ammoniæ Acetatis, fʒiv.

Spiritûs Vini Rectificati, fʒij.

Aquæ Puræ, fʒxiv.

Misce fiat Lotio.

COLLYRIUM.

F. 27. *Astringent Lotion.*

℞ Zinci Sulphatis vel Acetatis, gr. x.

Tinct. Opii, fʒss.

Aq. Destill. fʒviiij.

Misce fiat Lotio.

and he should be allowed to sip it after the manner of a glass of grog. It will not often fail to produce the desired effects.

LINIMENTS.

F. 28. *Strong Rubefacient Liniment.*

℞ Liquoris Ammoniae, fʒij.
Spiritus Terebinthinæ, fʒj.
Linimenti Saponis, fʒij.
Olei Olivæ, fʒiij.

Misce fiat Linimentum.

F. 29. *Strong Mercurial Liniment.*

℞ Unguenti Hydrarg. Fortioris, ʒss.
Liquoris Ammoniae, fʒss.
Spiritus Camphoræ, fʒj.
Olei Olivæ (vel adipis), fʒj.

Misce bene, et fiat Unguentum.

F. 30. *Strong Opiate Liniment.*

℞ Tincturæ Opii, fʒj.
Spiritus Camphoræ, fʒss.
Linimenti Saponis, fʒiiss.

Misce fiat Linimentum.

OINTMENTS.

F. 31. *Astringent Lead Ointment.*

℞ Plumbi Acetatis, gr. xx.
Cerati Simplicis, ʒiv.

Misce fiat Unguentum.

F. 32. *Stimulating Anodyne Ointment.*

R Pulv. Opii, ℥ij.
Unguenti Resinæ, ℥iij.
———— Cetacei, ℥j.

Misce fiat Unguentum.

F. 33. *Anodyne Bark Ointment.*

R Extracti vel Pulveris Opii, ℥ij.
Camphoræ, ℥j.
Pulveris Cinchonæ, ℥iiss.
Adipis (vel Cerati Cetacei), ℥v.
Spiritûs Vini Rectif. q. s.

Misce fiat Unguentum.*

* This is a most excellent application for all kinds of suppurating wounds. I used it in great quantities before Mooltan. It stimulates, gives tone, allays pain and irritation, and promotes healthy secretion of pus.

We may now proceed to the consideration of the manner in which we are accustomed to treat all and every lesion to which the soldier is obnoxious in the field.

We shall place these injuries under five great heads, namely—

1.

Cannon-ball wounds, which comprehend all	{	Lacerations. Compound fractures. Simple fractures. Concussion. Compression. Contusions.
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2.

Musket-bullet wounds, which comprehend all	{	Lesser gun-shot wounds.
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3.

Sword-cuts comprehend all Incised wounds.

4.

Lance wounds comprehend all Punctured wounds.

5.

Miscellaneous, including all	{	Dislocations and sprains. Retention of urine. Burns and blistered feet. Old ulcers, ophthalmia, iritis, poisoned wounds, &c. &c.
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TREATMENT OF LACERATED WOUNDS OF THE HEAD.

CASE I.—*Cannon-shot Wound—Simple Laceration of Scalp.*

A cannon-ball, at the height of its velocity, has inflicted a simple lacerated wound of the integuments of the cranium. The wound is six inches by four. The skin, superficial fascia, tendon of the occipito-frontalis muscle, and pericranium, are all more or less torn. The patient has vomited freely, and consequently recovered from the first effects of the shock. His pulse is somewhat accelerated, and he suffers considerable pain. Therefore, let him take immediately—

R Tinct. Opii, ℥xl.

Spt. Æther. Nitrici, ℥xv.

Misturæ Camphoræ, ℥ij.

M. Haustus.

Having placed him on a bed, with the head slightly raised and shoulders well supported, cut away the hair, and shave it off around the injury. Gently wash out all extraneous matter, and return to their natural places all the lacerated tissues, beginning with the pericranium.

Be careful not to use either ligatures or sutures. Apply soft lint dipped in warm water, to which a little Tincture of Opium may be added; carry a bandage wetted with the same round the head, and place oil silk over all.

Change the dressing twice in twenty-four hours, and not oftener.

On the fourth day, if suppuration be fairly set in, put aside the water-dressing, and substitute a portion of the following ointment, spread on lint, viz. :—

R Extracti Opii, ʒij.
 Camphoræ, ʒss.
 Pulveris Cinchonæ, ʒiiss.
 Cerat. Simplicis, ʒv.

Misce bene et fiat Unguentum bis die utendum.

Apply strips of adhesive plaster obliquely across the lint, and a bandage round, as tight as can be borne without giving pain, to support the whole.

Should too much vital action supervene, subdue it by depletion, mercurial purgatives, low diet, &c., and place the patient in a dark situation. If there be too little power, increase it by tonics and generous diet, admitting plenty of light and air.

CASE II.—*Cannon-shot Wound—Laceration of the Scalp with Depression of Bone.*

Here the round shot has produced a similar wound to the last, and in addition driven in upon the brain a portion of the cranial tables. The depressed piece of bone is as large as a watch-glass. There is palpable compression of the brain, indicated by the following symptoms,—namely, the patient lies prostrate on the bed, is insensible to all around, and cannot be roused ;

his pulse is slow, soft, fluctuating, and feeble ; his respiration prolonged and stertorous, and becoming instantly more and more so ; he is, in truth, dying, and will soon be dead if pressure be not immediately removed from his brain.

Place the head on a pillow, with the whole of the wounded surface *in situ*. Let an assistant hold it steadily in position, whilst others stand around to meet the operator's wants. Having removed the hair, and washed away all extraneous matter, turn back the integuments, and examine the depression. You find the pericranium still intact ; therefore make a crucial incision immediately over the spot to be trephined, and reflect the pericranium with the handle of the knife. Apply the trephine, and cut out a circular piece of bone by a bilateral rotatory motion. Brush away, from time to time, the bone-dust, and carefully examine with a probe the depth to which the instrument has penetrated. As you approach the dura mater withdraw the centre-piece a little, or, if you will, push it completely back. Having cut through the bone at one spot, proceed more carefully, and make your pressure as you saw directly opposite to that spot. When the circular piece of bone is separated all round, lift it steadily and remove it. If blood pour out, receive it on a cold wet sponge, and the bleeding will soon cease. Lastly, raise the depressed bone with the common elevator, making a fulcrum for it with a steel or silver spatula.

As soon as pressure is completely taken away, so

soon will the brain begin to recover its power, and the patient to return to consciousness. Now wash off all foreign matter, and, if there be only trifling hæmorrhage, bring back *seriatim* all the reflected tissues, and replace them carefully and lightly. Apply the warm water dressing, and oiled silk. Place the patient in a dark, cool, and airy place, guard against unfavourable symptoms, and set two men to watch him day and night.

CASE III.—*Cannon-shot Wound—Laceration of the Scalp, with Fracture and Depression of Bone.*

In this example the squamous portion of temporal bone is starred, and a part driven down upon the brain. The patient lies upon his back, motionless and insensible; you cannot rouse him. He notices not the roar of cannon being fired at his head. As in the last case, he is dead to all external things. Having placed him in a favourable position, with the head a little raised, lay back the torn integuments, and remove the completely detached pieces; but do not *cut* away anything. Examine the osseous wound with the finger, and see if there be room to introduce the elevator underneath the depressed bit of bone. There is not space enough; so take Hey's saw, and detach the most prominent angle of bone; remove it, and raise the depressed piece. Dress the wound as before, put the patient in a dark situation, and set men to attend his wants.

CASE IV.—*Cannon-shot Wound—Laceration of the Scalp, with Comminuted Fracture.*

Here we have very considerable lesion of bone. The os parietale is broken into many pieces, some of which are detached, and apparently depressed ; nevertheless, the patient is perfectly sensible, and complains neither of much pain nor uneasiness. Do not now attempt to remove the broken portions of bone. There are no symptoms of compression,—therefore cover up the wound lightly, keep it moist and warm, (not hot,) and leave the case for the most part to nature. Remember, all meddling here will increase the danger of fatal inflammation. Your prognosis is bad enough, it is true, but you cannot better it by dabbling in the wound.

The patient being an European, and a strong man, bleed him from the arm effectually, and give him by the mouth—

℞ Hydrarg. Chloridi, gr. x.
Pulv. Ipecac. gr. ij.
Ext. Hyoscyami, gr. ij.
Conf. q. s.
Pil. iij. statim sumendæ.
℞ Haustus Aperientis, ℥iij.
Ft. Haustus post horas duas adhibendus.
℞ Hydrarg. Chloridi, gr. xij.
Pulv. Opii, gr. iss.

P. Antim. Potass. Tart. gr. iss.

Ext. Glyeirrhiæ, gr. vj.

Misce bene et fiant Pil. vj. capt. j. 4tâ quaque horâ.

We need hardly say that every symptom must be diligently watched, both in this and preceding cases,—every measure taken to subdue inordinate inflammation. When healthy pus has formed, (for which there must be a free outlet,) the immediate danger to life has passed. Now any loose spiculæ of bone may be removed, and the wound may be dressed with poultices, or, what is better, the Bark Ointment, Formula 33.

CASE V. — *Cannon-shot Wound — Laceration and Comminuted Fracture of the Bones of the Face.*

The description of this case will apply to all other lacerations of the face, inasmuch as the example is an extreme one, and presents the following formidable symptoms, namely, —the round shot has passed from behind to before, impinging upon the angle of the lower jaw, passing slightly upwards and inwards, across the face. The malar bone, the superior and inferior maxillary, are shattered. The right eye is destroyed, and the nose injured. Portions of bone are driven into the mouth, which is nearly filled with blood and mucus. The patient has returned to consciousness, and evinces great suffering. He can neither speak, swallow, nor spit. The air-passages are clogged, and the breathing thereby rendered difficult and distressing.

In order to relieve these painful symptoms speedily, bring the patient to the bed-side, and with the wounded surface turned down, let an assistant hold his head over a pan of warm water. Now proceed, by means of a sponge, scoop, forceps, &c., to remove without force the detached portions of bone and effused blood. If during this manipulation there be much bleeding from the facial or any other artery, make pressure with the finger,—if need be, apply a ligature. Having removed all foreign matter, turn over the patient and place him on his sound side, and bring the whole of the laceration fairly into view. Now saw off the ragged extremities of the horizontal and ascending ramus of the lower jaw, also of the zygoma; replace the remaining sound bones as nearly in their natural positions as possible, nipping off the various sharp spiculæ; finally, bring together the integuments and muscles, introduce a piece of sponge into the mouth to give support, apply the warm water, and carry bandages round the head, to keep the whole together. As the patient cannot swallow, administer food and drink through a tube. If there be much mucus and blood about the fauces, fasten a sponge to a piece of whalebone, and mop it up from time to time. As reparation progresses pus will be abundantly discharged, and the patient will need support. Until the suppurative process begins, the less food the patient takes the better; of course, nothing but fluids are admissible. On the fifth day the Bark Ointment may be applied with the greatest advantage; and if any loose pieces of bone or spiculæ present themselves,

remove them, or nip them off. Do not meddle much or often with the torn structures; they will in a very remarkable manner adjust and accommodate themselves to their altered condition: but, as in every other case, treat symptoms only,—of which none give the surgeon so much trouble as the constant burning thirst. In cases where the whole face has been destroyed, (not uncommon,) and the poor soldier has wholly lost the power of swallowing, speaking, or even uttering a sound, you cannot mistake his wants. His cry, were he able to speak, would be “water! water!”* In order to alleviate this distressing thirst, administer, with your own hand, through a tube, as often as needs be, eight ounces of the following mixture:—

R Potassæ Nitratis, ℥ij.
 Acidi Nitrici diluti, ℥ij.
 Sacchari, ℥iv.
 Aquæ, Ox.

M. Mist. ℥vj. vel ℥viii. pro dosi.†

If the patient be accustomed to drink spirits, and you purpose giving an opiate, perhaps there is scarcely a better form than the following:—

* When I entered the fort of Mooltan immediately after its fall, and proceeded to remove the wounded, this distressing cry for water tended more to unman me than all the ghastly recent wounds, or all the disgusting gangrenous sores there abounding.

† This is cooling, palatable, and efficient. It keeps well, either with or without sugar, provided it be not very hot.

R Ext. Opii vel Pulveris, gr. ij.

Sp. Vini Galliei, ℥iss.

Aquæ, ℥vj.

Tere in mortario, et fiat haustus horâ somni vel statim sumendus.

CASE VI.—*Cannon-shot Wound—Laceration of the Muscles of the Neck.*

It is clear that all cannon-shot wounds, be they deep and situated at the *anterior* aspect of the neck, are fatal. In the following case, the wound is on the right side *posteriorly*. The integuments are extensively torn, and a flap of skin hangs down over the shoulder. The neighbouring muscles and parts about are a good deal bruised. There is some constitutional irritation, and the patient evidently suffers much pain.

Administer immediately the opiate draught, F. 24 ; place him in bed, and carefully support the head and shoulders, so that the muscles of the neck may be completely relaxed. Now, having washed all foreign matter away, restore the various structures ; and having brought back the flap of skin, put two or more sutures into it, in order to keep it in position. Apply the warm water dressing with opium, or

R Extracti Opii, ℥ss.

Aquæ bullientis, Oj.

Tere in mortario et fiat lotio.

At the expiration of four or five days, put on the Bark

Ointment, Formula 33, provided there be not too much inflammation. So soon as cicatrization begins, adopt some such measures as the following to prevent considerable contraction, namely,—carry a bandage upwards and forwards round the head, and a second upwards and backwards, from beneath the chin; fasten these together to support each other, and attach a long piece of cloth to them, which must be carried under the arm or round the waist, and made sufficiently tight to hold the head erect, or to draw it a little over to that side which is directly opposed to the injured part. Splints, or mill-board, may be tried; a good stock may be made with the last, and starch-bandages. If the patient is being carried from place to place, they will scarcely be borne, as it is very difficult to prevent their rubbing and pressing upon the sore.”*

CASE VII.—*Cannon-shot Wound—Lacerated Wounds of the Trunk.*

If these be very extensive and deep, and if the patient be not strong, death may soon put a period to his sufferings. There is not so much to be done here, as we have seen is necessary in such injuries of the head, and which is more especially called for in like wounds

* I recommend the surgeon to use his skill in order to construct apparatus for the prevention of contractions after burns and lacerations. I can scarcely speak with confidence of any appliance, having been myself very unsuccessful in the matter. It would be a boon, indeed, could any efficient means be found.

of the extremities. Here it is that the surgeon's medical knowledge is more particularly brought into play; and although in a large proportion of cases death may result, yet many admit of recovery.

There are three things chiefly to be done in all such cases as these,—three grand objects ever to be borne in view. These are, namely,—to resuscitate the patient, to subdue or ward off inordinate constitutional irritation, and to guard against inflammation, so that it may not exceed that which is necessary to the reparative process.

It must be remembered that these ends are not always to be gained by any fixed system of practice. I will not recommend either an active or inactive, a strong or mild form of treatment, because I know that neither can at all times be depended upon. No; let the surgeon meet, as best he can, each and every untoward symptom. He should notice whether the patient be an European, a Mussulman, or Hindoo. With the two first the treatment need not differ much; they equally bear depletion, and both willingly take medicine of every kind. The Mohammedan does not readily take wine or spirits, but you may give him stimuli in the form of physic. If your patient be a Hindoo, do not use your lancet but from absolute necessity; do not lower him much,—if you do, he will not soon rally; you will not find him in the ranks again. In India, the Hindoo, Mussulman, and Sikh, sometimes recover from injuries which (I may say,) necessarily kill the ordinary European. The black man, on his

own ground, does not usually suffer much from that irritative fever whereby the whole system is perverted, and which commonly in such lacerations as the following kills the whites.

CASE VIII. — *Cannon-shot Wound—Laceration of the Back.*

We have not met with a more formidable laceration than this, during our military practice. The patient when he received the shot was in the act of discharging his musket, in a stooping attitude. The ball I believe to have been one of Moolraj's four and a half pounders.* It passed obliquely downwards across the back, impinging upon the left scapula, and passing off just above the right sacro-iliac synchondrosis. The shoulder-blade is comminuted, and two or three of the spinous processes of the last dorsal and first lumbar vertebræ touched. None of the ribs are broken, neither is the pelvis implicated. The integuments and muscles are fearfully lacerated, the skin here and there hanging down in flaps. There appears to have been a good deal of hæmorrhage, for the wound is filled with clotted blood and dirt. The patient's pulse beats feebly, is small and slow. The surface of the body is cold; he is scarcely able to speak; he is sinking. Administer immediately—

* At the siege of Mooltan, and in the battle of Soorajkoond, we took four four and a half pounders. Moolraj's father had six cast for his son, about the year 1820.

R Ammon. Sesquicarb. gr. iv.
Spt. Ammon. Aromat. ʒss.
Mist. Camphoræ, ʒij.

Fiat Haustus.

Place the patient in a light and airy place ; let him lie on his right side, turned slightly on his face ; place the left fore-arm between pronation and supination across the breast, and fix it there. Now wash away all foreign matter, and remove detached pieces of bone. Do not insert sutures,—they are useless here ; but having brought all the parts as nearly together as possible, without dragging, place lint dipped in—

R Ext. Opii, ʒss.
Aquæ bullientis, Oj.

M. Lotio

over the whole wound, and carry a bandage round the body from below upwards, which must be wetted with the same from time to time.

Administer at bed-time, or so soon as reaction has fairly set in—

R Hydrarg. Chloridi, gr. vj.
Ext. Opii vel Pulv. gr. ij.

Let the patient drink of the Nitric Acid Mixture, Formulæ 18, if he be thirsty. At the expiration of two or three days remove the dressings, and apply the Bark Ointment. It may be necessary to bleed, and enjoin a low diet ; more commonly a full and generous

one will be needed, to support the patient's strength, and to repair damages.

CASE IX.—*Cannon-shot Wound—Laceration in the Anterior Aspect of the Chest.*

In this case the round-shot cut its way through the muscles of the left breast, occasioning a wound nine inches in length by five in breadth, and laying bare the cartilages of a rib or two. The skin as usual is considerably torn, and much muscular substance destroyed. The patient does not suffer in any great degree from the shock of the shot, but complains of severe pain and irritation. His pulse runs high, is hard and wiry; his skin hot and dry; there is some thirst.

Fiat Venesection ad ℥xvj .

R Hydrarg. Chloridi, gr. x.

Statim sumendus, et post horas duas sumat

Haustus Aperientis, ℥iv .

Dress the wound as before, first having restored the integuments to their natural places. Pass a broad bandage two or three times round the body, after the manner of a soldier's belt, and support the left arm in a sling. At bed-time let a full dose of opium be administered, and repeat it occasionally if needs be.

The Bark Ointment is the best application after two or three days, to be changed only for a large warm

poultice if it appear to be too stimulating, or not to favour a healthy discharge of pus, or the coming away of sloughs.

Small doses of calomel and opium will, perchance, be needed to complete the cure.

R Hyd. Chloridi, gr. xij.

Pulv. Doveri, gr. xx.

Misce bene et fiat Pil. vj. capt. j. 6tâ quaque horâ.

CASE X.—*Cannon-shot Wound—Laceration from above downwards, with Comminuted Fracture of the Clavicle and Injury of the Third and Fourth Ribs.*

This is an extreme example, and scarcely a reparable injury. The wound was occasioned by an eight-ounce iron ball, discharged at a distance of eight hundred yards, from a zumbora, or camel gun. The enemy pitched the shot into the allied camp, from the top of a high tree.* In descending, still having considerable momentum, it struck a fine native officer in the centre of the right clavicle, comminuting that bone, fracturing two ribs, passing through the pectoral muscles, and out. Considerable bleeding followed, and the patient fainted. You must place the wounded man in a light and airy

* During the first siege of Mooltan, Moolraj placed two or three zumboras in the branches of some trees under his walls, with which he harassed the auxiliary forces day and night.

place, and give him mild stimuli whilst you examine the wound,—

R Spt. *Ætheris Nitrici*, ℥xij.

Mist. *Camphoræ*, ℥iss.

Misce.

in doing which you will find it necessary to tie an artery or two. Saw, or nip off, the ragged ends of the fractured clavicle, as they are apt to occasion much irritation. In order to do this, carry with care a common spatula underneath each bone, and cut upon it. Remove all detached portions, bring soft parts together, and dress with warm water and opium as before. Put a large pad of tow in the right axilla to support the shoulder and arm, place the fore-arm across the belly just below the chest, and pass a bandage enclosing the upper arm round the body so as to support the whole. When the circulating system has regained its power, take blood from the arm to the extent of twenty ounces, and administer calomel and opium as often as needs be, to subdue inflammatory irritation.

Three days after the accident, this patient died of pleuritis and thoracic effusion. We have had men recover from equally desperate injuries of the chest,—not often, it is true; and we must not always expect such happy results. If the subclavian artery be wounded, death from loss of blood commonly soon follows. On the field of Suddozam we had occasion to amputate at the left shoulder joint, and afterwards

to tie the subelavian vessel. The patient lived five days, but was carried off at last by secondary hæmorrhage.

CASE XI.—*Cannon-shot Wound—Lacerations of the Abdominal Parietes.*

An example or two will suffice here.

In the first case you find an extensive wound running across the abdomen, from the right false ribs to the left anterior inferior spinous process of the ilium. The wound presents all the characteristics of severe laceration ; skin, muscle, tendinous and areolar tissue, are all much torn. There seems to have been bleeding from the epigastric artery. The wound is deep, going down, here and there, to the peritoneum itself, but the abdominal cavity is not penetrated.* There is no dirt or extraneous matter in the wound excepting coagulated blood,—do not, therefore, sponge it ; simply place the patient on his back, with the shoulders and thighs supported by pillows, in order to relax the recti abdominis muscles. Lightly replace the torn structures, and cover up the wound with lint sprinkled with tincture of opium. Apply a bandage, and moisten it constantly with warm water. If offensive effluvia arise, take off the dressing on the second day,—as a rule, do not

* In very hot climates, such wounds as the above will begin to stink in twenty-four hours.

remove it until the fourth, when the sore must be well cleansed and carefully dressed with the bark ointment.

Formula 33.

Peritonitis, intestitis, costiveness, constipation, or dysentery, are unfortunately apt to supervene. Meet them with calomel and opium, ipecacuanha, henbane, and hemlock; bleed profusely; enjoin a low diet and the strictest quietude. Costiveness is not dangerous in itself,—constipation is; it prohibits the use of opium. Substitute hemlock, and administer castor-oil by the mouth.

Dysentery here commonly proves fatal. Calomel is the surgeon's sheet-anchor, and must be freely given to affect the system thoroughly.

R Hydrarg. Chloridi, gr. vj.

Ext. Hyoscyam. gr. ij.

Statim sumenda.

R Hydrarg. Chloridi, gr. iij.

Pulv. Doveri, gr. ij.

Ft. Pulvis 4tâ quaque horâ sumendus.

CASE XII.—*Cannon-shot Wound—Laceration of the Abdomen, with Perforation of its Walls.*

In this example the round shot passed right across the belly, producing a ghastly wound, twelve inches by four, through which large portions of the intestines

protrude. They are not themselves wounded, neither are they (as commonly happens,) covered with dust and dirt. Do not, therefore, use the sponge and water. There is a little blood effused. No matter : return the intestines as they are. Blood is less irritating than water,—especially the water you are likely to get upon the field.*

When the abdominal viscera themselves are wounded by cannon-shot, the cases are wholly desperate and hopeless. Men, however, frequently live for hours in this pitiable condition. Yes, poor fellows ! they live with their intestines hanging down upon the ground. Do not let them die, whether they be friends or foes, in this miserable state. For the sake of humanity,—for common decency's sake,—dress them up ; and give strong stimuli with opium to alleviate the pangs of death.

R Solutionis Ext. Opii, ʒss.†

Sp. Vini Gallici, ʒss.

Mist. Camphoræ, ʒij.

Statim sumendus.

* At the first siege of Mooltan, in passing along the lines our attention was particularly drawn to a soldier who had just received a wound similar to the above. Being much pressed for time, I hastily returned the bowels, applied lint, and carried a bandage repeatedly round the body. The patient lived two days, and I had some faint hopes of his recovery ; but the army being obliged to retreat from before the place, I lost sight of him. I learned, some days after, that on being removed, he died.

† Take of Hill Opium four (ʒiv.) drachms and sixteen (16)

N.B. Never, on any account, cut off the ragged portions of intestine. Firstly, it is bad surgery; secondly, it is highly revolting to every looker on.

CASE XIII.—*Cannon-shot Wound—Lacerations of the External Generative Organs.*

During the war we treated a considerable number of cases. One or two examples, however, will suffice to illustrate the whole.

In the first, we find the penis alone injured. The gland is gone, with perhaps about one half of the whole organ. The stump presents a ragged, torn extremity, with portions of skin hanging down. The patient evinces much pain, especially during micturition, which may be interrupted by closing up of the urethral orifice. To obviate this, direct the patient on all occasions to pass his urine in warm water. If this cannot be done, at least let him thoroughly foment. The use of the catheter is seldom necessary here. If it be needed, use No. 8, and gently carry it into the urethra to the extent of an inch or two. If inflammation extend along the course of the urethra, and the passage be obstructed, bleeding, leeches, calomel, opium,

grains; boiling water, seven ounces and a half; spirit of wine, four drachms. One drachm of this solution contains four grains of solid opium.

with fomentations and the warm bath, must be resorted to ; after which, in order to re-establish the urinary passage, introduce a full-sized catheter, and carry it gently into the bladder. Sometimes, immediately after the accident, or when the sloughs come away, bleeding from the dorsalis penis artery sets in. You must not by pressure attempt to restrain it, but at once search for the vessel and apply a ligature. We before mentioned that these wounds are not dangerous to life. They do not kill the patient, but they occasion severe mental impressions, and he perhance kills himself. Opium judiciously applied will soothe the local symptoms ; the mental are to be combated with calm reasoning, kindness, and constant care. These seldom fail of their object.

CASE XIV.—*Cannon-shot Wound—Laceration of the Scrotum.*

We select this case from amongst the wounded enemy. It is in all respects a complete example.

The patient is a strong, healthy, remarkably well-proportioned man. He was a gunner in Moolraj's artillery, and in the act of stooping to his gun, when one of our 8-inch shells came in through the embrasure, and exploded near to his person. A portion of the shell, weighing about three pounds, struck him between the legs, and (as he himself said) "split him

up." The accident occurred four days ago, consequently suppuration is progressing, and there is a free discharge.

The fragment of shell in its course touched the pubis, and cut clean through the serotum, avoiding the penis and right testicle, but wounding and bruising severely the left. Both cords are uninjured. The missile, lastly, deeply lacerated the perinæum, keeping to the left of the median line, avoiding the anus, knocking off a small portion of the tuberosity of the left ischium, and escaped.

Together with suppuration there is necessarily some disposition to slough; and the left testicle itself is inclined to take on that condition.

Be not in a hurry to remove these sloughs, but rather dress the whole sore with the bark ointment; place the patient on his back with his legs drawn up, as in the operation of lithotomy, and let the dead tissues come away of themselves.

In no case cut off an injured testicle. Do not, indeed, excise any recently injured structures; they protect the uninjured parts, and act as coverings to them. After due time all dead matter is thrown off, or may be detached without force or the use of the knife. A small portion of the ischium will exfoliate, and must be removed by the forceps when it becomes loose.

The patient's strength must be attended to, and support given if there be inordinate suppuration. *Sutures are not admissible.*

We shall make some remarks relative to wounds of the spermatic artery in treating of incisions.

CANNON-SHOT WOUNDS. LACERATED WOUNDS OF THE LIMBS.

We have now arrived at that portion of our subject which is perhaps the most important of all ;—most important practically, inasmuch as cannon-shot wounds of the extremities are in every field most common, and above all others demand calm consideration, impromptu decision, vigorous and undeviating treatment. The good surgeon is indeed a blessing on the field of battle, when men are being cut down like grass, when the life's blood of hundreds flows forth unseen, when death walks out in open day, and is met at every turn ; then, and then especially, is the *surgeon's* presence of inestimable value. Then it is that he bends himself with vigour to his task : setting aside all sense of horror, and all thought of personal danger, he, like the "good Samaritan" of old, bends over his prostrate fellow man, and with pity and commiseration wrests from the hand of death the desperately wounded soldier.

We have ourselves seen something of such practice as this, and our remembrance of it in times of peace, when disappointment, sickness, and sorrow oppressed, has cheered our heart, and bid us look up with hope.

Before we proceed to treat special cases, we must of

necessity make a few general remarks on lacerated wounds of the limbs.

There are one or two principles applicable to every case, which can never with propriety be lost sight of; and the most important of all are these,—viz. : 1st, To save life; 2d, To save a limb; 3d, To render that limb serviceable to the patient. In order to attain these desirable ends, lose not an instant in carrying out your measures. Wait no longer than Nature herself demands : be your decision what it may, let not an idle moment pass. If you must needs take off a limb, do it at once. (I mean, of course, when the patient is in a fit condition.) Notwithstanding some objections, on the whole primary operation is *best* : I believe I know it to be such, and therefore unhesitatingly set it down as a rule.

There can be little doubt, taking all things fairly into consideration, that amputation immediately after injury is best; and we may without fear assert it. We cannot, however, so easily or so safely assert which mode of operating is best; neither is it easy to say which is (under all conditions) the most eligible manner of taking off a limb.

We shall not attempt (seeing how conflicting opinions are) to convince our younger brethren. We ourselves take a middle course,—*in medio tutissimus*,—they can follow; or, on the one hand, adhere to the old mode, or, on the other, prefer and practise the comparatively new.

We shall, however, briefly state our views regarding the flap and circular operations. We had thought much of them before entering on the bloody plains of India; we had assured ourselves of that which was best; but *practice* materially altered our notions. Our opinions were modified, in some respects changed—changed, perhaps, for the better, and remain as follows, viz. :—

Generally speaking, when *one* bone only is to be sawed through, the antero-posterior or the bilateral flap operation is most eligible. Of these two, the former is generally preferable, inasmuch as the flaps are, for the most part, more equal, and the cicatrices less pressed upon by the wooden leg during progression.

If two bones be implicated,—such as the radius and ulna, or the tibia and fibula,—then, undoubtedly, the old circular operation is preferable *as a rule*, and we commonly practise it. There are exceptions, however, in many special cases, as we shall by and by fully point out. But we must not neglect to state *en passant*, as a powerful *objection*—that *all circular amputations* are much more painful than flap, and that they cannot be performed so quickly,—not even when done in haste; but haste should never be used: no operation on the human body admits of haste. Smartness is most desirable. The military surgeon cannot be too smart in his manipulations: it renders him superior to many of his colleagues, and merciful to his patient.

CHLOROFORM.

Before we proceed, let us say a word on the use of chloroform and ether; (*and we wish to draw the attention of subordinate medical officers especially to the subject.*) We have not the pleasure of mesmerism's acquaintance, and we are not likely to make it, in the field.

Of chloroform much has been written; in its use much has been done. Some surgeons tell us they cannot operate without it: others declare it *never* does harm: many imagine it really does *good*: some look upon it as the most merciful gift of Providence: many swear by it: the natives of India bow down to it, and worship it as a god: some properly consider it (amongst many others) a useful remedy. But the practical surgeon views it in the hands of the *military* medical officer as a highly pernicious agent, which unquestionably *it is*.

We have used it ourselves largely, in cases we need not name; and we shall probably now and then administer it to the end of our career: but in time of war, on the field of battle, on the bloody plain, or in the field hospital, it should *not* be found. No place should be assigned it. Leave it with the medical store-keeper; place it on a high shelf in his warehouse, and, if it be hot, remove the stopper from the bottle to keep it cool.

We could with ease adduce fourscore cases to prove

that chloroform is injurious in field practice, but one example shall suffice.* That it renders the poor patient unconscious of pain cannot be doubted. But what of that? What is pain? It is one of the most powerful, one of the most salutary *stimulants known*. It often brings about reaction of the most *natural kind*, when many approved measures fail. Do we not know this to be the case? Have we not reason to remember (being compelled to operate during collapse†), that reaction began to appear with the application of the knife, and was fairly brought about before it was laid aside?

In desperate wounds of the extremities, where you are obliged to affix the tourniquet in order to prolong

* I had established a large hospital in the city of Mooltan, for the reception of the enemy's wounded. One morning, in going round, I noticed a man whose stump was being dressed, and was informed that a friend, who was in the habit of coming to my assistance, had amputated his thigh the evening before. I pointed out how well the operation had been performed, but added, feeling the patient's pulse, that he would not recover. Soon after, I met my friend, and said, "I have seen your handiwork up there, and a better or cleaner stump I have not often noticed. You will not, however, save your man." "Indeed! why, he is a fine strong fellow." "Ah, but he looks as if he had taken *chloroform*." "Chloroform! we gave it him before the operation, and he did not suffer the slightest pain." "Did you? then your patient's hours are numbered." He died before the evening.

† If hæmorrhage cannot be restrained by pressure, amputation must be instantly performed, as in comminuted fracture near the shoulder or hip-joint.

life, and to give time for the administration of stimuli, in order to render the poor sufferer able to bear necessary amputation,—will any thinking man again give chloroform? (We say again, for it has been too often given in similar cases.) We think—we hope not. Common sense will surely teach us better, and, notwithstanding the many plausible reasons in favour of chloroform, prevent us from committing an error which has hastened many a fellow-being to the grave.

CASE XV.—*Cannon-shot Wound—Laceration on the External Aspect of the Thigh, with slight Injury to Bone.*

This case presents a very extensive lacerated surface, and is on that account interesting. It serves to show that our prognosis may be favourable in some cases, provided bone be uninjured, or only slightly touched, no matter how extensive the flesh wound may be.

In the example before us, a six-pound shot impinged upon the right trochanter major, and chipped off a piece of that process, passed down the thigh, and escaped just between the patella and head of the fibula. Throughout the course of the ball, the skin, fasciæ, and muscles are torn to pieces. When you lift up the flaps of integument above, and allow them to hang down below, the wounded surface measures eighteen inches by nine. The femur is exposed in the centre of its

shaft, but not damaged. There is no bleeding, very little prostration, but considerable pain. Administer

R Spt. *Ætheris Nitrici*, ℥xx.

Tinct. *Opii*, ℥xl.

Mist. *Camphoræ*, ℥ij.

M. ft. *Haustus statim sumendus*.

Place the patient on his left side, turned slightly on his face; stretch out the sound limb in a line with the body, carry the wounded member across it, with the knee towards the edge of the bed, and place a pillow or a bundle of clothes underneath, to support the thigh and leg. Now replace, as far as may be, integuments, fasciæ, and muscular fibre. Use neither sutures nor ligatures, but carefully apply a well-wetted bandage from the toes to the hip. When you reach the knee, let an assistant place his hands longitudinally on each side of the wound, and let him press the torn structures towards their natural positions; slipping his hands gently along the thigh, as you proceed with the bandage. You are not likely to have oiled silk sufficient to cover up these extensive wounds. Be careful, then, to have them sprinkled from time to time with

R *Spiritus Ætheris Nitrici*, f℥iss.

Tinct. *Opii*, f℥ss.

Aquæ, Oj.

Misce fiat *Lotio*.

Do not remove the first dressing until the third or

fourth day ; then take it completely off. Cleanse the sore thoroughly, and dress with the bark ointment, F. 33 ; applying a bandage, as before, from the toes upwards.

Occasionally, as the patient will evince much suffering, give

℞ Extracti Opii (Hill), gr. ij.

Hyd. Chloridi, gr. iij.

H. s. sumend.

And, to allay thirst, the nitric acid mixture, F. 18,
vel

℞ Spiritûs Ætheris Nitrici, fʒss.

Liquoris Ammoniaë Acetatis, fʒij.

Aquæ, Oj.

Misce. ʒiv. pro dosi.

A bit of the trochanter major will exfoliate, and must be removed when loose.

CASE XVI.—*Cannon-shot Wound—Laceration on the Inner Aspect of the Right Thigh and back part of the Calf of Left Leg.*

In this instance the cannon-ball took an oblique course downwards, beginning at the middle of the right thigh, running to the inner condyle of the femur, and lastly passed through the calf of the left leg.

The shot appears to have been nearly expended ;

consequently, although the tissues are extensively torn, they are not disorganised, as in the last case.

There was a good deal of bleeding at the time of the accident; in order to stop which, the patient's comrades filled both wounds with gun-powder and cowdung.*

This extraneous matter must be thoroughly washed out, and a ligature or two applied. A few sutures may also be put in, and the whole bandaged, as in the last case, from the toes upwards.

Place the patient on his *right side*; flex the thighs upon the trunk, and the legs upon the thighs. Let the right be a little in advance of the left leg, which must be well supported by pillows.

Calomel and opium, salines and refrigerants, together with bleeding, may be necessary to subdue too much action, and to complete the cure.

CASE XVII.—*Cannon-shot Wound — Laceration of the Inner Aspect of the Thigh, with Division of the Femoral Artery and Vein.*

This is an example of those pre-eminently dangerous wounds which are designated transverse. The wounded surface is considerably less than in our two last examples. Nevertheless, the injury is immeasurably more perilous to life, and difficult to treat. The unfortunate

* A common practice amongst the natives of India.

recipient of this terrible wound was standing to his arms, with his legs separated, and the left advanced, when a six-pounder passed between his thighs, from before backward, tearing through all the soft structures down to the bone. The wound extended upwards to within an inch and a half of the groin, downwards to the middle of the thigh. There was a gush of blood, and the patient fell fainting to the ground. Hæmorrhage ceased, and he has in a manner revived. He is still, however, in a state of collapse; evinces no pain; is apparently inclined to sleep. This last is a most unfavourable symptom, and will speedily become the sleep of death if reaction cannot be brought about.

Treatment.

Place an assistant to guard against bleeding. Cover up the wound with lint; envelope the whole limb in a blanket; place the patient in a *light airy* place, with his head and shoulders only slightly raised; apply heat to the feet, and administer brandy and water warm, or ammonia, ether, and camphor, every quarter of an hour, until reaction is clearly manifest; then amputate after the following manner:—

We need scarcely say that amputation must be performed. The patient will not, however, readily submit. He will not immediately understand that it is necessary to sacrifice his limb in order to save his life.

Operation.

Place the patient on a table, with the wounded mem-

ber projecting free of its edge. Let one assistant command the femoral artery, by making pressure on it as it passes over the brim of the pelvis. Let another steadily support the limb below. Stand yourself on the patient's right. Pinch up with your left hand the integuments and museles on the outer aspect of the thigh. Pass the knife vertically downwards through the structures opposite to the upper edge of the wound, with its edge turned towards the knee, and cut out a flap five inches in length. Turn it back, and with one rapid sweep of the instrument divide all remaining muscular tissue, including periosteum, down to the bone.* Lastly, saw through the femur, and shave off any small portion of skin or musele that may hang from the upper part of the wound. *Instantly* secure all *small* arteries, or a considerable quantity of blood will be lost by them. Finally, cautiously draw out the femoral artery, and tie it firmly with strong silk. Dress up, introducing a few sutures where the skin is sound. Apply various slips of plaster, and a bandage, a fold or two of which should be passed round the trunk. Administer a full dose of opium, and enjoin quietude. There must needs be some sloughing. Let the patient be well supported from the first, and on the fourth day dress the stump with the bark ointment, F. 33.

* If periosteum be not completely divided in all amputations, it is apt to be torn from the end of the bone by the teeth of the saw, and thus occasion exfoliation. If it be an *object to preserve* the edge of the amputating knife, substitute a large strong scalpel.

CASE XVIII.—*Cannon-shot Wound of the Thigh,
with Fracture.*

This is a case in which, to all intents and purposes, the leg is carried away. It is our first example of those wounds, before spoken of, wherein the round shot, at the height of its velocity and momentum, smashes a limb. It is situate just above the knee-joint. The structures actually impinged upon by the shot are torn to pieces, disorganized, dead ; the leg is in effect gone. Amputation of the stump *must* follow. Perform it immediately.

Operation.

The old circular mode of operation is best in this and similar cases.

In the bilateral or antero-posterior flap, more muscle remains than there is integument to cover.

The muscles having been cut away from their insertions, retract forcibly towards their origins, and still more forcibly during the passage of the knife through them, leaving a large belly of muscle, more than sufficient to form a good stump,—more than there is skin to cover.

Having placed the patient in position, affix a tourniquet.* Let assistants support the limb above and below.

* Always apply a tourniquet in field practice. Some of the larger vessels may, indeed, be commanded by pressure of the fingers ; the smaller cannot, and blood will be lost. It is of the utmost importance not to lose a drop of arterial blood after gun-shot injuries.

Stand yourself on the patient's right ; grasp the thigh firmly with your left hand ; pass your right underneath the limb, holding the amputating knife between your fingers and thumb, and carry it round until it points obliquely downwards towards your own person. Now mark the course of the knife with your eye, and make a clean incision completely round the limb down to the *fascia lata*, drawing the knife from heel to point. Let the assistant retract the integuments to the necessary extent ; pass the knife round as before,—make a second incision, and divide the muscles to the depth of an inch and a half. Now draw back both muscle and skin as far as may be, and with a third circular sweep cut down to the bone. Apply the saw in a horizontal line,—draw it from heel to point, and divide the bone by a steady forward and backward motion of the instrument, without a jerk and without pressure. Tie the femoral artery, and one or two smaller. Insert four sutures. Apply one circular strip of plaster, three from behind to before, and one transverse. Put a bandage lightly on, and keep it moist. Give the following draught :—

R Tr. Opii, ℥xl.

Mist. Camphoræ, ℥ij.

Dress on the fourth day, and treat symptoms.

CASE XIX.—*Cannon-shot Wound of the Thigh,
with Fracture.*

Here we present a complete example of those wounds

wherein bone is fractured at a considerable distance from the spot where the round-shot strikes.

We have said that the surgeon has in these cases a painful duty to perform. It is a painful duty to be obliged to amputate at the hip-joint, when the wound is at the knee.

A cannon-ball having nearly run its course, perhaps during its last vindictive bound has smashed a thigh immediately above the knee. Skin, muscle, vessel, and bone are crushed,—the leg is attached only by shreds of flesh. The thigh itself hangs loosely down, and upon examination you find the femur fractured close to the hip-joint. To amputate immediately above the wound would be barbarous, and assuredly fail of its purpose. No : amputation at the hip-joint itself only remains to be done. You must not turn from this operation if you be really anxious to save a life. Do not, however, operate without there be a reasonable chance of success. Rather let the soldier die of his wound than subject him to painful and useless mutilation.

If, however, he evinces great powers of life, and has lost but little blood,—if reaction returns quickly, together with general warmth and sensitiveness of pain, without sickness or subsultus tendinum,—then are you justified in amputating at the hip-joint. It should be performed as soon as possible.

Operation.

This is a formidable, but not a difficult operation. Nevertheless, it requires some forethought and steady-

ness of purpose. The great danger is loss of blood, which you must guard against by tying the femoral artery at once. Cut down upon it as it emerges from the pelvis, underneath Poupart's ligament, and apply a ligature above the profunda. If, however, you have assistants about you on whom you can fully depend, you may entrust the femoral artery to one of them. You must secure the truncated vessel immediately the anterior flap is completed, and all small vessels too, as a *drop* of blood cannot be spared. Well, having taken every measure to guard against hæmorrhage, and the patient being favourably placed and supported, thrust in a long, straight, one-edged knife, a little above and to the inner side of the trochanter-major. Keep it close to the bone, pass it obliquely downwards and inwards until it protrudes close to the groin, and cut out a flap three inches in length. Instantly reflect and secure the arteries. This being done, and the flap well lifted up, cut down to, and open, the capsular ligament. Direct the assistant to depress the femur slightly, and rotate it outwards forcibly; then divide the ligamentum teres, and disarticulate the thigh-bone. Lastly, pass the knife over the head of the bone, and cut out the posterior flap. Quickly tie every arterial branch,—sponge out all coagula,—insert eight sutures,—apply twelve strips of plaster obliquely,—put a large piece of lint covered with Ceratum Resinæ along the course of the wound,—and a bandage over all.

As much depends on the after-treatment of these cases, I shall dwell a little upon it, although it is out

of my way. In the first instance, the patient must be placed in an easy position on a soft bed; a rope must be suspended above his head with a stick attached within reach of his hands, in order that he may be able to lift himself a little, and shift his position. The wound must be dressed on the fourth day, and not before, and the utmost care must be taken in removing the dressings. The ligatures are not to be meddled with, neither should there be much pressure made above or below the wound in order to squeeze out matter. Pus must not, however, be allowed to accumulate, or to remain about the dressings. The patient's bowels should be kept gently open with castor-oil, and he should be lifted on to and off the bed-pan. If the chylopoietic viscera get out of order, blue pill and ipecacuanha, with small doses of decoction of aloes, are the remedies; if the patient be restless, henbane and hemlock will give relief; if he be thirsty, the nitric acid mixture, Form. 18, should be given; if he be feverish, it must be combated with calomel, antimony, and saline sudorifics. His diet must be strictly in accordance with the state of the stomach and the condition of the stump.

CASE XX.—*Cannon-shot Wound immediately below the Knee.*

The deadly round-shot has so effectually done its work here, and so close to the joint, that amputation above is obviously necessary. There is no objection

now on the score of retraction of muscles. Accordingly, perform the flap-operation. The antero-posterior is best.

It should be done near the knee ; but the tendon of the rectus femoris muscle in front, and that of the semi-membranosus and tendinosus behind, must not be included in the flaps.

Operation.

Apply a tourniquet. Grasp the thigh with both hands, in order to ascertain its circumference. The limb being twenty inches round, make the flaps four inches in length.

Pinch up the muscles in front of the thigh, thrust in the knife, and boldly transfix the limb anterior and close to the femur. The instant the point of the instrument protrudes, carry it firmly forwards, and out at a spot already marked with the eye. Reflect the flap, and cut out the posterior after the same manner, without again perforating the skin. Turn back this flap also, and with one rapid sweep of the knife divide all remaining soft parts down to the bone, to which apply the saw in a horizontal line, and cut it steadily through. Tie the femoral artery, and three small branches ; sponge out coagula ; bring the flaps into close apposition ; insert five sutures ; put on one broad circular strip of plaster, and three strips from before backwards ; apply a bandage, and keep it moist.

CASE XXI.—*Cannon-shot Wound, midway between the Knee and Ankle-joint.*

Supposing the leg to be sixteen inches in length, a six-pounder in the height of its power, striking upon the centre of the tibia, crushes to atoms about one-third of its shaft, and the wound extends upwards five inches from the knee.

Either the circular or flap operation may be performed. I used to fluctuate between the two,—now preferring the first, and then the second mode. The circular operation is, however, best: the extremity of a flap is apt to slough. Be careful to make your first cut above all discoloured skin.

Operation.

Affix a tourniquet. Let an assistant steadily support the limb above the knee. Grasp with your left hand the leg below, pass the knife round, and make an incision through the skin. Retract the integuments two inches or more according to the thickness of the leg, and with two circular cuts lay bare the bones. Pass a catlin downwards between the tibia and fibula, and again upwards in a similar manner, cutting from and towards yourself,—dividing completely interosseous membrane, muscle, and periosteum. Finally, saw through the bones separately,—the fibula first, holding the saw obliquely; then the tibia, holding the instrument in a horizontal line.

The bones may not be sawed together. They cannot

be steadily held in position; the saw will get locked. Shave off the anterior acute angle of the tibia, and dress.

CASE XXII.—*Cannon-shot Wound, just above the Ankle, with Fracture at the Knee.*

This wound extends five inches from the ankle, and presents the usual appearances of cannon-shot wounds of the second order. At first it seems a fit case for immediate amputation at the centre of the leg. But, alas! on closer examination we find the tibia fractured at the knee. This, then, is another example of the terrible effects of spent shot; and admits only of amputation of the thigh, as described at Case XX.

Examine the amputated leg, and you find bone broken into the joint, the muscles separated from their cellular attachments, and their interspaces filled with blood.

CASE XXIII.—*Cannon-shot Wound, immediately above the Ankle-joint.*

I point out this case in contradistinction to the last: it is a very good example of the effects of the cannon-ball at the height of its velocity and strength. It is the nearest approach to actual excision of a limb by the round shot, that I have met with. The ankle-joint and foot hang only by a few aponeurotic strings. The muscular tissue about the wound has much the appear-

ance of coagulated blood. The bones are crushed into many fragments ; the tibia and fibula clean cut through. Pass your fingers over their ends, and you find the cancellated structure pulverized. The bones are not, however, fractured above,—neither are the soft parts damaged. This is, then, a fit case for amputation at the middle of the leg,—making a flap of the gastrocnemius and soleus muscles.

Operation.

Place the patient in position, and apply a tourniquet over the femoral artery. Direct an assistant how to support the limb below the knee. Grasp the leg with your left hand, resting the point of the index finger upon the inner edge of the tibia ; that of the thumb on the fibula, and vice versâ according to the limb. Draw the amputating knife from finger to thumb, and cut out a short semi-lunar flap of skin ; now plunge in the instrument from thumb to finger, and transfix the leg, keeping the knife close to and behind the bones ; cut obliquely downwards towards the foot, and complete the flap at a spot already marked with the eye. Lastly, with the scalpel divide remaining soft parts, and saw through the bones. Secure three or four arteries, introduce four sutures, apply one broad strip of plaster from behind to before ; one from side to side, and one round above to support the whole.

CASE XXIV.—*Cannon-shot Wound of the Foot and Ankle-joint.*

Here the foot is gone,—hangs only by a portion of the tendo-achillis, and the malleoli are broken.

The case offers a fair opportunity for amputation immediately above the joint.

Operation.

I do not consider amputation of the leg, as near the ankle-joint as it can be performed, either a very safe or desirable operation. It is a customary one, however, and easy. Nevertheless, it leaves a long inconvenient stump, and is oftentimes attended with real danger. The operation is very simple. Apply a tourniquet. Grasp the left hand over the spot where you propose to divide the bones. Make a clean circular incision through the integuments. Draw back the skin an inch and a half, and with one firm annular cut lay bare the bones. By means of a small cut divide remaining soft parts, and apply the saw. Dress up, being careful to pass a broad strip of plaster round the leg just above the stump, in order, as far as may be, to tie down the tendons of the flexor and extensor muscles of the foot. It is the motion of these tendons, especially if patients be on the move, which so seriously interrupts the healing process, and oftentimes causes death.

CASE XXV.—*Cannon-shot Wound of the Leg, with
Fractured Fibula.*

We very rarely meet with cannon-shot wounds of the extremities, wherein bone is fractured, that admit of reparation. Alas! all,—nearly all, peremptorily demand amputation. I have sought amongst hundreds of wounded for one such ease. The cases before us are, however, examples. At the battle of Suddozam, a native artillery officer was gallantly standing to his guns, when one of Moolraj's six-pounders struck him on the outer side of the right leg, close to the head of the fibula, followed the course of that bone, crushing it to atoms, and escaped an inch above the external malleolus. The integuments and muscles are lacerated in the usual manner. The wound when laid open presents a raw torn surface, eleven inches by six. It is not deep; there is little bleeding. The tibia is wholly untouched. Do not amputate. Quickly cleanse the wound. Remove loose portions of bone. Return the torn tissues to their places as best you may. Place a large piece of lint dipped in the opium lotion, F. 25, over the whole wound; and apply a wetted bandage from toes to knee, which must be diligently kept moist. Place the leg on its inner side supported by a pillow, and prevent pressure upon the wound.

On the fourth day, substitute the bark ointment, F. 33, and put on a dry bandage, rendering it tighter from day to day. Pieces of bone may be from time

to time removed, and the ragged ends of the fibula nipped off.

Allay irritation with opium and calomel ; keep down too much action with calomel and purgatives,—too little demands acids, iron, and quinine. If these things be fairly attended to, the soldier will return to his duty.

CASE XXVI.—*Cannon-shot Wound of the Foot.*

This case likewise happened in the last-named battle field. The recipient also a native officer.

The foot, nearly as far back as the tarso-metatarsal joint, is irreparably destroyed ; in common parlance, carried away by a cannon-ball, leaving naught but amputation to be done. Your space is small enough, but you must risk a little to save the ankle-joint. Chopart's mode is most eligible.

Operation.

Place the patient on a table. Apply a tourniquet. Direct an assistant to hold the leg above the ankle. Grasp with your left hand the lacerated stump. Slightly depress the foot. Draw the knife across the dorsum, and cut out a semi-lunar flap, commencing an inch behind the base of the metatarsal bone of the little toe, and terminating at a small tubercle that may be felt on the inner side near the anterior extremity of the astragalus. Reflect this flap of integument. Divide the extensor tendons. Disarticulate the cuboid and

scaphoid bones ; pass the knife underneath them, and form a flap of the remaining sound plantar muscles and skin. Dress with sutures, plaster, and a bandage, being very careful in dressing this stump not to disturb any adhesion that may have taken place. Much will depend on the after treatment.*

CASE XXVII.—*Cannon-shot Wound of the Toes.*

The whole of the phalanges, together with the metatarso-phalangeal joints, are in this instance destroyed. The case presents a fair opportunity for amputation at the tarso-metatarsal articulation. I do not, however, recommend that operation ; I consider the following better ; it takes less time to perform,—(very desirable in this painful operation.) The wound heals quicker, and a sounder and a better stump remains.

Operation.

Grasp the wounded foot with your left hand, resting the point of the index-finger on the base of the metatarsal bone of the little toe, the thumb on the internal cuneiform bone, and *vice versa*. Draw the knife

* We cannot expect this stump to heal very favourably or very quickly, seeing that the flap of integument is somewhat short and bruised. As soon as it has healed, or is fairly progressing, the tendo-achillis must be divided by subcutaneous incision ; otherwise the gastrocnemius muscle will forcibly draw the os calcis backwards and upwards, throwing the stump upon the ground.

from heel to point, across the dorsum of the foot, from the point of your finger to that of the thumb, and cut out a semilunar flap. Now, without removing the knife, transfix the plantar muscles of the foot, holding the blade of the instrument close to the bones. Carry the knife forwards, and make a flap as long as the condition of the parts will admit. Lastly, turn back both flaps, divide remaining tendons and muscles, and saw through the bones.

N.B. A full dose of opium must instantly be administered.

CASE XXVIII.—*Cannon-shot Wound of the Right Shoulder-joint.*

This injury appears to have been occasioned by a four-pounder. The ball impinged upon the head of the humerus, shattered it, smashed the acromion process, fractured the clavicle, and split the scapula to pieces. The shoulder-joint is irreparably injured, the extremity itself for ever gone, and demands to be removed *en masse* from the trunk.

The patient lies necessarily in extreme collapse. Great pains must be taken in order to bring him about. Due time must be given for reaction to manifest itself. Then the extremity, with the exception of a portion of the clavicle, may be completely removed.

Operation.

As the axillary artery remains entire, pressure need not be made.

Place the patient on his left side, slightly turned on his face, and bring the whole of the shoulder fairly into view. Let assistants stand by, to arrest hæmorrhage, and to supply the operator's wants.

Now, with a large scalpel, make an incision from the inferior angle of the scapula, in the course of the anterior costa, over the head of the humerus, and three inches down the outer side of the arm; a second incision from the point of the acromion to the posterior superior angle. Turn back the skin, and reflect it a little beyond the base of the scapula. Dissect out the whole bone, leaving as much muscle as possible. Lastly, make a long flap of the remaining muscle and integument on the inner aspect of the arm. Make pressure on the subclavian artery before you divide the axillary. Instantly secure the vessel, and all others that bleed. Saw or nip off the ragged end of the clavicle. Bring back the reflected structures, and cover up the wound as best you may. Apply numerous strips of well-warmed plaster; over these lint dipped in lotion, F. 25; and over all a large compress of linen cloth, supported by a bandage. After-treatment similar to that of amputation at the hip-joint.

The great dangers are—general irritation, thoracic inflammation, and effusion; also exhaustion from copious and long-continued discharge of pus.

CASE XXIX.—*Cannon-shot Wound of the Arm.*

In this instance the wound extends upwards to the

middle of the arm, and presents the ordinary appearances of lacerated wounds. Amputation may be performed either by the antero-posterior flap, or circular mode. We determine generally in favour of the last.

Operation.

Let the patient be seated. Apply a tourniquet, and let assistants give the needful support.

Grasp the mutilated limb with your left hand. Carry the right, holding the knife, underneath, and round the arm. Make a circular incision through the integuments down to the deep fascia.

The arm being ten inches in circumference, retract the skin an inch and a half, and cut down to the humerus with two sweeps of the knife. Carry the last incision a little higher up than the first. Finally, saw through the bone.

Tie the brachial artery and two smaller branches, avoiding the median nerve. Dress *secundum artem*, and treat *secundum consuetudinem*.

CASE XXX.—*Cannon-shot Wound of the Right Arm, above the Elbow.*

Again we have an example of the sad effects of spent shot. We find the wound at the elbow, and the humerus broken at the shoulder-joint. Nothing remains to us but amputation at that joint. We must do it as speedily as circumstances will permit.

Operation.

Place the patient on a table, with the damaged limb projecting. Put a hard pillow under his shoulders, and support his head. Direct an assistant to make pressure on the subclavian artery as it passes over the first rib.

Stand in front of the arm (behind in case of the left). Pass the knife underneath the deltoid muscle from before to behind, on a level with the joint, cut downwards towards the insertion of the muscle, and make a flap of it. Draw the knife across the tendons of the supra-spinatus, infra-spinatus, and teres minor muscles. Lay open the joint. Pass the knife over the head of the humerus, cut downwards and outwards, and detach the limb.*

Secure the axillary artery, which will for the most part suffice. Sponge out coagula, and carefully adjust the flap. Apply sutures and plasters. Place a compress and a bandage over all.

CASE XXXI.—Cannon-shot Wound of the Fore-arm.

When in doubt as to the propriety of amputating below the elbow, perform it above. Amputation may be done in the fore-arm as high up as the insertion of the biceps muscle.

* Where the deltoid has been much lacerated, I have made flaps from the inner aspect of the arm sufficient to cover the wound.

In our example the lower third of the arm is shot away. Parts above remain untouched. Amputation below the insertion of the pronator radii teres is the proper course, and the circular mode the best.

Operation.

Place the patient in a sitting posture, and apply a tourniquet, in order to compress the brachial artery.

Make an incision through the skin ; draw it back an inch or more. Cut down to the bones ; pass the catling between them. Divide all muscular fibre and periosteum. Apply the saw in a horizontal line to both bones, and cleanly cut them through together. Secure the radial, the ulnar, and the two interossei arteries ; and dress.

CASE XXXII. — *Cannon-shot Wound of the Hand and Wrist.*

During the siege of Mooltan accidents of this nature were constantly happening, rendering amputation necessary. Not only were they occasioned by the enemy's shot, but also by the frequent bursting of matchlocks, muskets, and pistols, which the native soldiers always overcharge. In our example, the hand is almost severed from the arm, hangs only by a tendon or two, and amputation of the stump is obviously inevitable. It may be done immediately above the wrist-joint. It is a simple, easy operation. I shall not again, however,

perform it ; neither shall I stop to describe it. I will not recommend that operation ; I disapprove of it ; I consider it dangerous, and seriously protest against it when men are being moved from place to place. I lost three patients in succession during the war, and without any reason, save that the flexor and extensor tendons, moving so freely, interrupt the healing process, occasion violent constitutional irritation, and death. Amputation just below the insertion of the pronator radii teres is the safe and proper course.

CASE XXXIII. — *Cannon-shot Wound of the Hand, extending to the Carpal Bones.*

This case admits of amputation at the wrist-joint, an easy and a safe operation ; makes a neat stump, and seldom terminates unfavourably.

Operation.

Having placed the patient in a suitable position, with a tourniquet applied, bandage up the mutilated member, and grasp it with your left hand, an assistant holding the limb above.

Make a semilunar incision across the back of the hand, from the styloid process of the ulna to that of the radius, and a similar flap on the palmar aspect.*

* Some surgeons disarticulate the bones, and cut the palmar flap after. This method necessarily includes portions of the flexor tendons, which I consider by no means desirable. The flaps should be composed of integument only.

The flaps being reflected and held back, slightly depress the hand. Divide the extensor tendons, posterior and lateral ligaments of the joint. Disarticulate the scaphoid, semilunar, and cuneiform bones. Cut through the flexor tendons, and detach the hand. Tie three or four arteries ; put in three sutures ; apply three strips of plaster, one circular and two transverse, and a bandage upwards to the elbow. Give a dose of opium, and enjoin rest. It is not necessary to remove the styloid processes of the radius and ulna, nor to shave off their cartilages.

Cannon-shot Wound of the Fingers.

It is scarcely necessary in this place to speak specially of these. We shall have a more favourable opportunity of saying all that is required for practical purposes, when we treat of lesser gun-shot wounds.

CHAPTER II.

LET us now turn to the treatment of those wounds which are occasioned by the musket, rifle, or pistol-bullet, and which in every battle are more abundant than any other kind of injury whatsoever.

In the treatment of these most dangerous and fatal wounds, let us ever strive to attain three great ends, namely,—To rouse the patient from that deadly collapse into which he inevitably falls: To arrest hæmorrhage: To fend off and guard against subsequent inflammation. These things are to be reached by prompt attention and decided measures,—by constant care, and undeviating steadiness of purpose,—not by much manipulation, nor by fluctuating between two modes of treatment,—not by much food, nor much physic. These things are highly reprehensible, nay, destructive of life.

CASE XXXIV.—*Gun-shot Wound of the Left Side
of the Head.*

We present this our first case, in order to show that

the musket-bullet occasions concussion of the brain, without lacerating the integuments. The bullet struck upon the left parietal bone, and the soldier fell instantly senseless to the earth. You find slight puffing up of the skin, with a little discolouration, but no other external signs of injury. The general symptoms are those of well-marked concussion.

Treatment.

Instantly cut and shave off the patient's hair. Mix ten grains of calomel with a little lard or butter; attach it to the end of a quill, introduce it into the pharynx, and leave it there. Apply on very thin old linen cold evaporating lotion, such as F. 26. Raise the patient's head a little, and support it laterally, so that it may not roll about. Place him in a dark situation, watch him, and let him alone. When reaction is really manifest, bleed and purge him. This constitutes the primary treatment.

CASE XXXV.—*Gun-shot Wound on the Back Part of the Head.*

Here the bullet penetrated to the external table, near the occipital protuberance, and you can with the finger feel it lying upon the bone. The patient has in great measure recovered from the first shock, and complains only of slight pain and uneasiness.

Treatment.

Instantly shave off the hair round the wound. Make a vertical incision across it, and cut down upon the bullet, which remove by means of a dressing forceps or elevator. Dress with warm water and oiled silk; take ten or fifteen ounces of blood from the arm; give six grains of calomel at once, and two hours after four ounces of the purgative mixture, F. 12. Enjoin the strictest repose, and be ready to meet untoward symptoms as they arise.

CASE XXXVI.—*Gun-shot Wound of the Right Side of the Head, with Fracture.*

The bullet in this case, having great momentum, penetrated the skull through the right parietal bone, driving a portion of it in upon the brain, and is itself lodged within the cranium. The symptoms are those of compression: see Case II.

Treatment.

Place the patient's head upon a pillow, with the wound *in situ*. Shave off the hair to some extent completely around. Make a crucial incision, two inches and a half in length, immediately across it, down to the external table. Reflect the integuments, and turn back the pericranium; as you cannot, for want of space, remove the detached bone, apply the trephine as described at Case II. Lift up the broken fragment, and

search for the bullet, which (if it be not deeply imbedded in the brain) you will find lying to one side or other of the external wound.

Treatment as before described at Case II.

CASE XXXVII.—*Gun-shot Wound on the Anterior Aspect of the Head and Face.*

This is the only example of the kind I have to offer. The ball passed into the left eye, and out just above the meatus auditorius externus. In its course it destroyed the eye; passed through the orbital process of the malar bone, and a portion of the great ala of the sphenoid; passed along the temporal fossa, touched the root of the zygoma, and escaped. The patient fell to the ground, but soon recovered from the shock. You find him with slightly accelerated pulse, some pain and giddiness in the head, but able to walk about and answer questions.*

Treatment.

Give immediately six grains of calomel; at the expiration of two hours, four ounces of the purgative mixture, F. 12 or 13; one of the pills, F. 6, every six hours; and the nitric acid mixture, F. 18, if thirst be pressing.

Do not on any account probe the wound, or forcibly

* This patient completely recovered, and is now doing duty in our ranks.

detach spiculæ of bone. All extraneous matter will easily come away when suppuration is fairly manifest. Warm water, or poultices, may be used, and the wounds should be cleansed every day.

CASE XXXVIII.—*Gun-shot Wound of the Neck.*

Here the ball entered the neck near the anterior edge of the trapezius muscle, on the right side, took a somewhat circuitous course, and remained lodged underneath the integuments on the other side. The patient felt a severe shock, and is now sick and giddy. There appears to have been a slight shock to the spinal marrow. There is, however, no evidence of fracture, although the ball must have passed between or over the spinous processes of the cervical vertebræ.

Treatment.

Make an incision, two inches in length, in the course of the trapezius muscle, and extract the bullet by means of a dressing forceps. Introduce the little finger into each wound, in order to ascertain if portions of cloth be present. Cover up the wounds with lint dipped in lotion, F. 25. Dress with warm water, and in four days apply the bark ointment, F. 33.

CASE XXXIX.—*Gun-shot Wound in Front of the Neck, with Wound of the Left Common Carotid.*

I was standing near a small window with a Euro-

pean soldier, watching the effects of our cannon-shot upon the walls of Mooltan, when a bullet came in, and struck my comrade in the neck on the left side, divided the carotid artery, and passed downwards towards the chest. The soldier falls prostrate on the floor, crying, "Good-bye, my friends!" There is fearful hæmorrhage. Lose not a moment; stand not an instant uncertain what to do. Throw yourself down by the patient; place your thumb upon the vessel as it ascends behind the clavicle. Make pressure backwards and a little inwards, and keep it up until bleeding has wholly ceased, and the vessel secured. The common carotid can be easily commanded by pressure of the thumb. It is not, however, an easy matter to apply a compress with the same effect, and to enable the patient to be sent to the rear. In all probability he will die of hæmorrhage on the way.

The only safe plan is to tie the divided vessel, above and below, immediately and upon the spot.

Operation.

Place the patient on his back. Slightly raise his shoulders. Throw back the head, and turn the face to the opposite side. Now make an incision, two inches and a half in length, directly across the wound, in the course of the sterno-cleido-mastoideus, and divide skin, platysma myoides, and fascia. The edge of the scalpel may now be dispensed with, and the handle only used in turning aside veins, nerves, and cellular tissue, until the divided artery be brought

into view. Be careful not to use force in applying the ligatures. Seize the vessel below first; gently draw it out a line or two (warning the assistant not to relinquish pressure), and tie it firmly with a full-sized ligature. Lastly, secure the vessel above, avoiding the pneumogastric and descendens noni nerves. Hæmorrhage from veins must be stopped by long-continued pressure.

Such a case as this is not to be met with except in action. Except the surgeon be upon the field, he will never meet with a case of this kind, nor, indeed, with many other kinds of wounds, which are so quickly fatal that they do not admit of carrying the wounded a mile or two to the hospital.

CASE XL.—*Gun-shot Wound of the Clavicle.*

In this case a matchlock ball impinged upon the centre of the clavicle, and comminuted it. A third of the bone is gone. The arm hangs powerless by the patient's side, and cannot by any effort of his be lifted up.

Treatment.

In one or two cases I cut down upon the fractured portions, nipped off the ragged ends of the clavicle, and removed them.

It is, however, better to dress the wound with warm water and poultices, and to take away the broken portions of bone during the suppurative process.

Place a large soft pad in the axilla; bring the arm to the side; carry the fore-arm, between pronation and supination, across the chest, and support the whole with a well-applied bandage.

The antiphlogistic regimen and treatment must be strictly followed for ten days, when tonics may be given, with nutritious food.

CASE XLI.—*Gun-shot Wound of the Thorax.*

This is a terrible wound, commonly a fatal one. It is an example wherein the bullet passes right through the chest, from side to side, apparently traversing both lungs. The shot passed in on the right side, and out at a corresponding spot on the left. The patient throws himself from side to side, in an agony of suffocation, coughing up florid streams of blood. His extremities rapidly lose their natural warmth; the surface of his body becomes cold and clammy; his pulse sinks to nothing; and death ends the scene.

When you meet with a case like this immediately after the receipt of the injury, instantly put the patient in a sitting posture, and bleed him from the arm until he be on the verge of syncope. Now gently lay him down, and administer

R. Plumbi Acetatis, gr. j.

Træ. Digitalis, ℥xxx.

Træ. Opii, ℥x.

Acidi Acetici diluti, ʒj.

Aquæ, ʒiss.

Pt. Haustus.

This draught should be repeated in a quarter of an hour, and it should be given every half-hour until hæmorrhage ceases.

As soon as the patient begins to revive, lift him again into the sitting posture, and if hæmorrhage returns, bleed a second time from the arm, and carry it to the utmost brink of syncope. All pressure should be removed from the chest; abundance of air admitted, but not a bright light. Warmth should be applied to the extremities, and the lower part of the body covered well with cloths.

This is an extreme case, and, I need hardly say, scarcely recoverable. Profuse bleeding is, in truth, the only means of saving or of prolonging life: it should be repeated again and again, without hesitation or doubt,—much care being taken not to carry it so far as to produce complete syncope; for, be it remembered, reaction strongly manifests itself after this state, and destroys its good effects. Immediately after venesection, or together with it, sedatives and narcotics are indispensable: they are, opium, acetate of lead, foxglove, hemlock, and henbane.

CASE XLII.—*Gun-shot Wound of the Thorax.*

This case, although it be similar to the last, and dangerous in the extreme, nevertheless admits of complete recovery. It is a very fair example of the terrible effects of the musket bullet. The shot penetrated

below the left breast, passed through the chest from before backwards, traversed the left lung, and remains lodged underneath the skin, near the inferior angle of the left scapula.

The patient lies prostrate on his back, with much distress depicted in his face; he lies upon the ground almost as motionless as his relinquished weapon; his features appear pinched; his countenance is livid; his breathing quick, short, interrupted, and sighing; his pulse slow, small, intermitting, and feeble. In short, the systemic circulation is fearfully depressed; the pulmonary seriously impeded; the vital powers dangerously cast down, nearly extinguished. The patient now and then utters a short cough. His lips are streaked with blood. He lies in that extreme state of collapse which is next akin to dissolution—a state in which many fine fellows die upon the field, without an effort being made to save them; they die suffocated in their jackets, and for want of help. Where is the surgeon now? Where is he? Two miles in the rear, amputating limbs, perhaps, that may possibly admit of delay for an hour or two.

Treatment.

Raise the patient's head and shoulders a little, and turn him slightly on to his uninjured side. Remove all clothing from his chest and abdomen. Place him in a light and airy position. Put lint dipped in turpentine over the region of the stomach. Apply heat in the axillæ, between the legs, and to the feet; and ad-

minister cautiously the following draught until reaction begins to manifest itself; then all internal stimuli must be set aside.

R Spiritûs Ætheris Sulph. Comp. f3j.

Mist. Camphoræ, ʒij.

Misce: fiat Haustus, quartam partem horæ sumendus.

Now, having brought about reaction, with some degree of warmth and animation, lift the patient into the sitting posture, cut down upon the bullet, and remove it. Place moistened lint over the wounds, but do not on any account plug them up. If, after reaction be fully established, hæmorrhage supervene, bleed from the arm and give sedatives, as described in the foregoing case; and be guided by circumstances.

CASE XLIII.—*Gun-shot Wound of the Liver.*

When this essentially vascular viscus is fairly shot into, there remains but little hope of saving life, or even of prolonging it. There is but one chance for the poor sufferer; that is, his being seen by the surgeon on the very spot where he receives the wound. It is idle to talk of sending him to the surgeon; let the surgeon come to him, or let him die where he lies! A wound of the heart itself is scarcely more fatal—scarcely more to be feared: do not, therefore, lose an instant in the application of your means.

In the case before us, the shot entered near the

cartilage of the first false rib, passed obliquely backwards and upwards, through the substance of the liver, and escaped. There is some hæmorrhage by the external wounds, of a partly arterial and venous character, and abundant evidence of fatal bleeding within. The patient's countenance strongly portrays the near approach of death; and he will soon be dead, if hæmorrhage be not arrested.

Treatment.

Gently raise the patient into the sitting posture. Quickly strip off his jacket, and take blood from the arm until he be ready to faint. At the same time give two grains of acetate of lead combined with opium, as F. 7. Remove all tight clothing; admit plenty of pure air; exclude the light. Support the patient with pillows, between a sitting and recumbent posture, and strictly forbid talking, noise, or any kind of motion. Venesection must again be resorted to if hæmorrhage returns, and lead, with full doses of henbane and digitalis, be repeated every quarter or half hour until their effects are clearly manifest. The nitric acid mixture, F. 18, may be given to allay thirst. Indeed, the patient must be content with that alone for the first twenty-four hours.

CASE XLIV.—*Gun-shot Wound of the Spleen.*

This wound is little less dangerous than the last. Our remarks in that case will amply apply to this and

the treatment must be the same. The diagnosis is not always so clear, but the symptoms of hæmorrhage cannot often be mistaken or overlooked.

CASE XLV.—*Gun-shot Wound of the Kidney.*

Here we have also an exceedingly dangerous wound. Its situation, direction, and depth, together with the presenee of bloody urine, are conclusive evidencee of the nature of the injury.

Treatment.

Full and copious bleeding, in order to restrain hæmorrhage ; digitalis, hemlock, and henbane, to diminish the heart's action ; calomel, opium, purgatives, low diet, and profound rest, to keep off inflammation, and, if possible, prevent destructive suppuration and sloughing. Small quantities only of acidulated barley- or gum-water should be allowed for the first two days. Examine the state of the bladder often, and introduce a catheter on the least appearance of retention of urine.

CASE XLVI.—*Gun-shot Wounds of the Intestines.*

Again we have a highly dangerous class of injuries ; not, indeed, so instantaneously destructive of life as many of the foregoing, but more fatal than they in their subsequent effects.

In wounds of the lungs, liver, and spleen, our primary indication is to wrest the patient from the immediate hand of death. In those of the kidney, intestines, and bladder, we concentrate our forces against inordinate inflammation and its effects.

My first case presents a good example of wounds of the abdomen wherein the bullet passes clean through the belly from side to side.

The symptoms are, in brief, severe pain,* collapse, anxiety, and great mental alarm. The prognosis is very unfavourable, the diagnosis uncertain, as to injury of intestines; the treatment uniformly the same.

Treatment.

Before all things it is necessary to place the patient in an easy position upon his back, with his head and shoulders raised, his thighs drawn up, and supported with pillows in order to relax the recti abdominis muscles. Introduce the little finger into each wound, and ascertain if there be any extraneous matter in them; if there be, remove it with a common dressing forceps. Cover up the wounds with moist lint and oiled silk, and when pain is very great pass a broad bandage round the body: it will give great relief. As the collapse is very alarming, you must do something for its relief. Do not, however, on any account give stimuli by the mouth. You may place a mustard-poultice, or lint dipped in turpentine, to the scrobiculus

* Not by any means a constant accompaniment.

cordis, with the best effect ; and warmth or friction may be applied to the extremities.

Put plenty of cloths upon the patient, and see that they do not press upon the belly. Impress upon the patient the absolute necessity of his remaining perfectly quiet, neither moving hand or foot.

Now, reaction being manifest, administer two grains of calomel and one of opium. Take fifteen ounces of blood from the arm, or as much as the patient can bear without fainting. Repeat the opium every two, four, or eight hours, according to circumstances ; and bleed again if the pulse runs high, is hard and jerking. Barley water alone must be allowed for the first three days, a mouthful of which may be given from time to time.

Purgatives are to be strictly prohibited. They are not to be given on any pretence whatever. They are not only hurtful, but positively destructive of life. The patient's urine must be drawn off when necessary by means of a catheter. Throughout the whole treatment too much delicacy of manipulation cannot be used ; nor too much care taken in avoiding excitement, and every thing that tends to it.

CASE XLVII. — *Gun-shot Wound of the Bladder.*

The measures enumerated in the foregoing case will amply apply to this. But, alas ! no means will avail, as the bladder is shot through and the bullet remains

lodged in the abdomen. Strong opiates may be given; they relieve pain, allay irritation, and diminish the secretion of urine. Mild purgatives may be called for. A gum-elastic catheter must be carried into the bladder, and kept there.

CASE XLVIII.—*Gun-shot Wound of the Bladder from above the Pubis.*

Here the missile passed into the urinary bladder from above the pubis, and remains lodged in that viscus itself. Its presence may be inferred from the situation of the wound, pain, difficult micturition, and the bloody appearance of the urine. The introduction of a metallic sound, and a little careful manipulation, will speedily detect the extraneous body, and satisfactorily confirm the primary diagnosis.

Treatment.

Of course, the first thing to be thought of is to remove the bullet from the bladder. It should be done as soon as possible. Done, I say, immediately, as it is apt to occasion violent irritation, inflammation, and death.

Operation.

An attempt may be made to extract the ball, by means of a long, straight, bullet forceps, through the wound. It will, however, rarely succeed, as the external wound is seldom in relation to that of the bladder. It

is better at once to perform the following operation, viz. :—To open the bladder, as in the high operation for stone. I do not by any means recommend this operation in case of calculus in the bladder: I never perform that operation, even when I know the stone to be *very* large: but, already having an opening in the upper part of the bladder, I without doubt consider it proper to cut down upon that viscus above the pubis, and if possible extraet the bullet through the hole that itself has made.

Place the patient on his back upon a firm table, raise his head and shoulders in order slightly to relax the abdominal museles. Introduce a full-sized sound into the bladder, depress the handle, and carry its point upwards behind the pubis to that portion of the bladder which is uncovered by peritonæum. Press it gently on that spot, and let it be held steadily in position. Now make an incision three inches long in the median line, and dissect down to the bladder, following, if possible, the course of the wound. Having reached the bladder, pass a straight sound downwards, in order to ascertain the exact position of the ball. Lastly, introduce the forceps and remove it. A gum-elastic catheter must be worn in the bladder, and the urine allowed to dribble away. Every precaution should be taken against extravasation, inflammation, and the formation of abscess. I need hardly say that, if the wound in the bladder cannot be readily found, an opening must be made into it at that spot where it is uncovered by peritoncum.

CASE XLIX.—*Gun-shot Wound of the Bladder
per Perinæum.*

In all gun-shot wounds of the perinæum and parts about, the bladder should be examined with a full-sized sound, in order to ascertain if the bullet be lodged therein.

In this example, the situation of the wound in front of the anus, its direction, and the discharge of urine by it, lead us to conclude that the bullet has passed into the vesical cavity. We ascertain whether it has passed out of it again by means of the sound. It has not passed out; it remains in the bladder. Proceed, therefore, to remove it per perinæum.

Operation.

Place the patient on a table with his legs drawn up and secured, exactly as in the lateral operation for stone. Make an incision two inches in length through the skin and superficial fascia immediately across the wound; pass the index finger into it in order to enlarge it, and carry it into the bladder. Then introduce the smallest sized lithotomy forceps, and extract the ball.

If the extraneous body cannot be thus removed, which indeed it seldom can, the *lateral* operation must be performed, as in lithotomy. For minute description of this operation see Mr. Bransby Cooper's "Essays on Lithotomy," or any other recognised authority. For my purpose a short description will suffice.

Operation.

Place the patient near the edge of a strong table. Draw up his legs, and fasten his hands to his feet. Support his back with pillows, and let his thighs be held firmly apart, in such a manner as to bring the whole of the perinæum fairly into view

Now carry a full-sized straight staff into the bladder,* and direct an assistant how to hold it steadily in position.

Seat yourself upon a chair, and place the point of your left index finger on the raphe of the perinæum, opposite the arch of the pubis. Now make an incision from the point of your finger downwards and outwards to a spot midway between the anus and tuberosity of the ischium, and a line or two beyond. Next pass the finger into the upper part of the wound, and feel for the groove in the staff, into which carry the point of the knife guided by the finger, hold the point of the knife firmly in the groove, and make a cut in its course to the extent of an inch. Lastly, draw down the staff horizontally, and push the knife along it, keeping it steadily in the groove, into the bladder. Withdraw the knife without cutting in any direction; pass the finger, draw out the staff. Introduce the forceps over the finger, and extract the foreign body. If bleeding follows, apply pressure, and it will soon stop. Do not pass a catheter by the wound in order to inflame and

* It is sometimes difficult to introduce the staff after tying up the patient. I often pass the instrument before taking that step. It is a good plan.

irritate the bladder. Allow the urine to escape by the wound itself; keep it clean; administer to the patient's wants, and he will speedily recover.

I now pass to

GUN-SHOT WOUNDS OF THE EXTREMITIES.

Of these a few important examples must, perforce, suffice, as I cannot stop to describe all the cases I have witnessed.

CASE L.—*Gun-shot Wound of the Hip.*

When a musket, rifle, or pistol-bullet, gets lodged in the parts about the hip, it is not always easy to form a correct diagnosis. It is not easy to follow the ball in its course, or to ascertain its whereabouts. Very often the surgeon does well in leaving the case to nature, enjoining rest and treating symptoms.

There are, however, cases not a few wherein his skill is immediately needed, and cannot fail of benefiting the patient.

The following case is one of these :—The bullet struck with great force upon the upper part of the thigh, about two inches below the anterior superior spinous process of the ileum, and passed clean through backwards and a little outwards, smashing in its course the neck of the thigh-bone. The limb is slightly shortened, turned out, and there is some bleeding from the wound. The diagnosis is clear enough,—comminuted fracture

of the neck of the femur cannot be mistaken. The treatment is also clear, and should as soon as possible be entered upon without giving the patient unnecessary pain. Give

R Pulv. Opii, gr. ij.

Hyd. Chloridi, gr. v. statim.

Repeat the opium without calomel in fifteen minutes, if it fail to relieve pain. Encourage the patient, and assure him that it is not necessary to take off his limb. When pain and irritation have in some measure abated, cut down upon the neck of the bone, and remove its broken fragments.*

Operation.

Place the patient on his back, turned a little to his sound side, near the edge of a table. Let him be well supported by assistants. Make a semicircular incision from a spot midway between the anterior superior spine of the ilium and spine of the pubis, downwards and outwards over the trochanter major, and backwards and upwards to a corresponding spot behind. Dissect back, and raise both skin and muscle from over the neck of the fractured bone. Make pressure upon, or tie the bleeding arteries, sponge out coagula, and extract the detached pieces. Nip or saw off the ragged ends

* If broken pieces of bone be not removed at once in cases such as this, the patient will die of exhaustion, or recover with a much shortened and useless limb.

of the femur. If need be, remove its head from the acetabulum; carefully secure every bleeding vessel, thoroughly cleanse the wound from granules of bone, return the flesh to its place, and put in a few sutures. Gently make the limb of the same length as the uninjured one, and apply a long, straight splint, so as to prevent motion, and to keep up some degree of extension. A slight degree of pressure should be applied to the wound by means of lint and plaster: tight bandaging is not on any account to be used. Much will depend on the after treatment of the case.*

* At the siege of the Fort of Luckkie, (the Fort of Luckkie lies on the right bank of the Indus; it was taken by Lieutenant Taylor after twenty-nine days siege. See my sketch of the siege of Mooltan,) a soldier received a large bullet in the right hip, which smashed the trochanter major and thigh-bone. I saw the patient about twelve days after the accident. He had been subjected to native treatment. His thigh was enveloped in many layers of oiled cloth, and the fracture pressed upon by two rude splints. I found the wound in a most offensive state, and freely suppurating. The limb was everted and shortened. The patient's health was much affected by the purulent discharge, which was clearly kept up by a mass of comminuted bone. I removed the fragments, placed the limb on pillows, and he speedily recovered. This man called on me twelve months after, in order to procure a certificate. He could walk about with ease, resting the injured limb upon the ball of the foot. The comminuted portions of bone should have been removed immediately after the accident, or the limb amputated at the hip-joint.

CASE LI.—*Gun-shot Wound of the Thigh, without Fracture.*

I have known patients die of such a wound as this, after months of suffering.

It is situate in front of the thigh, near the junction of the upper with the middle third, and the bullet lies flattened upon, or near the bone. The femur is not fractured, but it has received a terrible shock, and is very seriously bruised, together with its periosteum. Inflammation is about to set in, to be followed by long-continued exhausting suppuration.

Treatment.

Our first indication is to extract the bullet; its presence must needs greatly increase the mischief. The first step is to ascertain its exact position. This is usually done by a system called *probing* and *pinching*,—both of which are unhappy terms. Let us say a word of the two processes.

The first consists in exploring a wound by means of a common probe, which is, by the by, in these cases a very useless instrument. Let us call the process *examining* and *sounding*. The first is done quickly, effectually, and safely, by means of the index or little finger; and the last, through the medium of a full-sized, straight, metallic sound. Do not, however, probe with this instrument. Do not thrust or push it here and there; rather feel your way with it to the bottom of

the wound, and strike, holding it between the finger and thumb, after the manner of sounding for calculus in the bladder.

That manipulation called pinching consists in pressing the finger points in every direction around, in search of the ball. It should be done firmly, regularly, and will often succeed; all processes of bone, tendons of muscle, and fasciæ, being noticed as you pass.*

The common dressing forceps is the best instrument for removing bullets when they are near the surface: a forceps made by Mr. Weiss answers fairly, when deep. The old bullet forceps, with a bulbous extremity, is positively a useless thing.

N.B. If the bullet cannot be extracted after two or three judicious attempts, cease your endeavours for a time; wait until suppuration sets in: then, the muscle being relaxed and less irritable, you cannot fail of your purpose.

If the bullet be distant from the wound—from the spot where it entered the limb—but near the surface at another spot, cut down upon, and extract it. Do not attempt to pull it out by the way it went in.

Well, the bullet having been removed, place your patient on his back; raise the knee, and put a pillow underneath the ham. Support the limb also laterally with pillows, and apply warm water to the wound. If

* When the surgeon fails to discover the ball, the patient himself should be directed to make this kind of investigation, as he lies upon his bed. He will often be successful.

the patient be strong, take fifteen ounces of blood from the arm, and administer the following :—

R Hydrarg. Chloridi, gr. iij.

Opii, gr. j.

M. ft. Pulvis statim sumendus, et post horas duas
sumat Haust. sequentem

R Haustûs Sennæ, ʒiij.

On the second day warm fomentations will be called for, to relieve pain and swelling. The pill, F. 6, should be given every four hours, and

R Pulv. Doveri, gr. x.

Ext. Hyoseyami, gr. ij.

H. s. o. n.

The nitric acid mixture, F. 18, may be given, to allay thirst, three or four times a day.

When the suppurative process begins, a more generous diet must be allowed. If the discharge be profuse, and likely to continue long, give bark, quinine, and steel; fresh animal food, with wine; and forget not plenty of air and light. Apply a bandage lightly, to support the muscles of the thigh. If pus burrows, let it out at the most dependent part as soon as detected.

CASE LII.—*Gun-shot Wound of the Thigh, with
Comminuted Bone.*

This case shows the necessity of amputation when

the femur is broken by a musket-ball. The shot passed through the limb at the junction of the middle with the lower third, and the thigh-bone is crushed. Pass the little finger into the posterior wound, and you find it coated with granules of cancelli. Amputation is the only remedy. Perform it as described at Case XX.

CASE LIII.—*Gun-shot Wound of the Condyles of the Femur.*

When, as in the case before us, a musket-ball has passed through the condyles of the thigh-bone, terribly comminuting it, according to a good old rule we ought to cut off the limb. This is doubtless a sound axiom; it is the safer course. There remains, however, another method by which life may be saved, and the limb rendered useful to the patient,—that is, by excising the extremity of the bone, by sawing off the broken condyles.

In our example, the shot struck upon the external condyle of the left thigh-bone, passed clean through, splitting both condyles into the knee-joint.* Now it must be apparent even to the tyro, that such a condition of this important joint admits not of reparation. He would probably instantly amputate the limb. I, however, propose to extirpate the fractured condyles,

* I have not performed the operation here spoken of, but I fully propose doing so the first opportunity. Amputation was done in the case above.

and to save the limb, with, of course, the sacrifice of the knee-joint.

Operation.

Place the patient on his back upon a firm table, with the wounded limb projecting. Let him be well supported with pillows, and steadily held by assistants. Place yourself on the patient's right, and place the knee to be operated on, with the leg stretched out, in the most favourable position. Now (all things being ready), with a largest size scalpel make an incision, beginning three inches above the joint, on the inner side, exactly opposite to the shaft of the bone; carry it downwards over the internal condyle, outwards across the ligamentum patellæ (which must be divided), over the external condyle, and upwards to a spot three inches above the joint on the outer aspect. Dissect back and reflect the skin, patella, and the origins of the vasti and crureus muscles. Next flex the knee, and divide the lateral ligaments of the joint. Now cut through the crucial ligaments, press back the head of the tibia into the ham, and carefully detach the origins of the gastrocnemius, plantaris, and popliteus muscles, keeping the edge of the knife towards the bone. Lastly, pressing back the tibia still further, carry a broad spatula behind the femur, just above the condyles, to guard the artery and all soft parts, and saw off the condyles as high up as the nature of the fracture may require. It will be necessary to remove the patella, and to apply a few ligatures; the fewer the better. The

wound must be very carefully cleansed of blood and particles of cancellated structure of bone, the flap returned and neatly adjusted, a few sutures inserted, and as many strips of plaster applied as are necessary to keep the edges of the wound in close contact. The limb must be placed in the straight position, upon a long and very well padded back splint, which must be bound to the leg and thigh sufficiently tight to prevent motion, but not in any way to impede the circulation. The after-treatment must be most diligently attended to, and guided wholly by circumstances.

CASE LIV.—*Gun-shot Wound of the Head of the Tibia.*

When a bullet becomes lodged in the head of the tibia (or, indeed, in the condyle of the femur), and the bone is neither split nor broken, it may be removed with the aid of the trephine, the elevator, and a strong bullet-worm, similar to those used in drawing a ball from a rifle or gun.

In our case, the shot passed completely through the head of the bone, fracturing it into numberless pieces; and I have nought to recommend but amputation above the knee. Let it be done as shown at Case XX.

CASE LV.—*Gun-shot Wound of the Leg.*

Be not in haste to cut off legs when wounded by the

musket or pistol-ball. We say, be not in haste, because such wounds will frequently heal in a very remarkable manner, leaving good and serviceable limbs. When one bone only is fractured, and the tibial arteries remain untouched, primary amputation should scarcely be thought of. In every case, at least wait until the suppurative process be fully established. Then only operate when the discharge of pus is very profuse, and likely to exhaust the patient.

With regard to the case in hand, the ball entered the left leg close to the tibia on the inner side, passed backwards and outwards, and you find it lodged upon the fibula behind. There is very considerable arterial hæmorrhage from the wound, and consequently sufficient reason to conclude that the posterior tibial artery is injured.

Treatment.

Firstly, apply a tourniquet over the femoral artery, in order to prevent further loss of blood. Secondly, carry your finger into the wound, and ascertain the precise position of the bullet, and notice whether it can be removed by the way it entered. As that cannot be readily done, make an incision over it in the course of the muscles, and draw it out with dressing forceps.

Having extracted the ball, place the leg on its outer side, well flex it on the thigh, and extend the foot. Now make an incision, four inches in length, over the bullet wound, and very carefully and slowly dissect

down to the lacerated vessel. The posterior tibial artery, in the normal state, lies about an inch from the inner edge of the tibia. This knowledge will not, however, always lead you to the divided vessel; you must be guided by the course of the wound, and the flow of blood. Slightly slacken the tourniquet, and notice accurately whence the blood flows: again tighten it, sponge well the wound, and search for the transected vessel above and below. Having found it, apply ligatures; carefully remove coagula; neatly close the wound; apply two or more strips of plaster, leaving interspaces for the escape of fluids. Put on a wetted bandage from the toes to the knee; slightly raise the leg, and support with pillows; enjoin complete repose; keep the patient low for a day or two, in a dark situation. Visit him frequently, and examine the state of the leg and wound, by the appearance of which you must be wholly guided in your treatment.*

* To tie the posterior tibial artery is a difficult, painful, and dangerous operation. Too much care cannot be taken in order to prevent unnecessary laceration of soft parts. In extracting bullets, *force* should not be used; it is apt to induce inflammation and its worst consequences.

During the second siege of Mooltan, a man was brought in, some six hours after the accident, with a bullet in his leg; I easily detected it lying between the bones behind. I passed a forceps, seized the ball, and began to draw it out. It moved easily enough at first, but soon got jammed, and I was obliged to use considerable force in order to get it out. It was very much flattened and very ragged, and must have torn soft parts a

I believe Mr. Guthrie insists that in every case the artery should be tied above and below the wound. I cannot question so great an authority; indeed, I am fully aware that in bleeding from considerable arteries nothing equals the ligature in preventing further hæmorrhage; but I must say, I also fully believe that in every case it cannot be done: for instance, when the limb is very fleshy, very much swollen (having been bandaged upon the field), and filtrated with blood; or when a bullet enters the leg at the junction of the middle with the lower third, runs upwards to the ham, and wounds the artery by the way. In this case it would be almost impossible to ascertain the exact position of the wound in the vessel. To follow the course of the ball until you reach the divided artery, would be scarcely justifiable. To cut down upon the vessel, either by the side of the tibia, or vertically through the gastrocnemius and soleus muscles, would be still less likely to succeed. Apparently, then, nothing remains to be done, but either to tie the femoral artery, or to amputate. Well-applied pressure may, however, be tried. The bullet must be extracted; firm compresses of lint, many times folded, placed upon the wounds; and a well-wetted bandage carried from the extremity of the toes to the groin. The limb must be raised up, as in fractured patella, and carefully supported. Profound

good deal, as I am sorry to say the most violent inflammation came on, which the next morning had extended to the middle of the thigh, leaving no hope of the patient's recovery.

rest must be enjoined; the patient placed in a dark situation, and kept low. A draught should be given every six hours, and the mixture, F. 18, as often as needs be, to allay thirst.*

CASE LVI.—*Gun-shot Wound of the Leg, above the Ankle.*

Here the tibia and fibula are so severely comminuted, that it would be idle to attempt to save the limb; therefore let amputation be performed, as shown at Case XXIII.

We give this case to show that, when both bones are comminuted, amputation must be performed.

* During the siege of Mooltan, one morning in going round, accompanied by Lieut. Pollock, my attention was drawn to a case of musket-bullet wound of the leg. The ball entered on the inner side of the calf, and passed slightly upwards and outwards. The limb had been tightly tied up, and was somewhat swollen. I introduced my finger into the wound, and readily discovered the ball lying near the fibula behind. It not being convenient to extract it at that moment, I turned to another case, but had scarcely commenced enquiries, when Pollock said, "Doctor! that man seems to be bleeding a good deal." I looked up, and, to my surprise, saw blood flowing from the wound in a florid stream. I instantly passed my finger into it, affixed a tourniquet, drew out the bullet, applied compresses, and a bandage from the toes upwards. Hæmorrhage was effectually and completely restrained. This man recovered without any additional operation.

CASE LVII.—*Gun-shot Wound of the Ankle-joint.*

We find this wound running obliquely through the joint, from within outwards; and we notice synovia, mixed with blood and small particles of bone, oozing from it. The ball struck just above the internal malleolus, and escaped at the point of the external one. There is no apparent displacement; no abnormal appearance about the joint, with the exception of the wound. The slightest manipulation, however, affords evidence of fracture, and the presence of comminuted bone in the joint. The patient can scarcely bear the least motion of the foot; he evinces the greatest dread of your gentlest touch. Your course is palpably clear. Administer a strong opiate, viz.—

R Tr. Opii, ℥xl.

Tr. Hyoscyami, ℥xx.

Spt. Æther. Nit. ʒss.

Mist. Camphoræ, ʒij.

and proceed to amputate the leg after the manner described at Case XXIV.*

* The late Lieut. Christopher, I. N., was wounded exactly in the manner described above. I saw him on the instant, but did not instantly determine to operate, which I should have done. Influenced partly by the feelings of the patient, the hopes of his friends, and my own anxiety to save the leg of a very valued friend, I weakly resolved to wait. Ten days after the leg was amputated, the patient being under the influence of chloroform, and he died.

CASE LVIII.—*Gun-shot Wound of the Foot.*

We may now set aside the knife for a time, and wait with patience the course of events : wait, at least, until inflammation has subsided—until healthy suppuration be fairly progressing. Even now do not be hasty with the knife; do not unnecessarily cut away any structure. Bear in mind that musket-bullet wounds of the foot admit of reparation in a very remarkable manner. Bone will exfoliate, tendons slough, suppuration be very profuse, hæmorrhage itself supervene, and yet the case may terminate excellently well. It may, indeed, be necessary to remove a bone, or perhaps a toe; but that is a matter for after-consideration. For the present enjoin the strictest mental and bodily rest. Place the foot in an easy position on a pillow; put lint, dipped in the lotion F. 25, upon the wound or wounds, and poultices over all. Give opium with ipecacuanha occasionally, and regulate the patient's diet according to the exigencies of the case.

Warm poppy fomentations, and opiate poultices, give great relief when pain is severe. Suppuration must be speedily induced, and free openings made for the escape of matter. If there be much irritation, a full dose of calomel and opium at bed-time is the best remedy.

R Hydrarg. Chloridi, gr. vj.

Pulv. Opii, gr. ij.

H. s. s.

Splints well applied, well padded, and so adjusted as not to press upon the wound or give pain, are perhaps of more use than any other single remedy : they must never be forgotten. They may be made of wood, leather, millboard, straw, or any substance sufficiently stiff to prevent motion.

CASE LIX.—*Gun-shot Wound of Parts about the Shoulder.*

This is the first gun-shot wound I ever met with in the field. It was received at the battle of Suddozam. The patient had been subjected to the tender mercies of Punjaub doctors for three days.*

The ball entered immediately above, and a little in front, of the head of the humerus ; passed backwards, inwards, and slightly downwards, underneath the scapula ; and you find it lodged near the fourth or fifth dorsal vertebra.

Treatment.

Make an incision, an inch and a half in length, in

* The native doctors placed this man upon his face, and, having anointed the parts about the shoulder with oil, they kneaded the skin and muscles along the course of the wound, making pressure upon the ball, in order to drive it out by the way it came in. Having failed in this, they covered the part with cow-dung and gunpowder, and left the bullet to take its own course. I extracted the ball, fixed the joint, and the patient speedily returned to his duty.

the course of the dorsal muscles. Cut down upon and extract the bullet. Introduce lint, dipped in lotion F. 25, into the wound, in order to keep it open. Put a pad in the axilla to support the shoulder, and fix the arm by means of a bandage. Press gently along the course of the wounds daily, and notice if there be any extraneous body within reach of the forearms, such as wadding, pieces of cloth, &c. Apply poultices at first, and lastly the bark ointment, F. 33. Inflammation and its consequences must be strictly guarded against.

CASE LX.—*Gun-shot Wound of the Shoulder-joint.*

A musket-bullet, in this case, passed clean through the head of the right humerus, from before backwards, crushing it to powder. Carry your little finger gently into the posterior wound, and you will find it coated with particles of bone. A little examination will suffice to show you that the head of the humerus is irreparably injured, but that its shaft remains entire. Do not use much manipulation, as it occasions intolerable suffering, and quickly induces inflammation and violent irritation. Enjoin quietude, well support the arm, and order a full dose of opium. When pain and irritation have in a measure subsided, cut down and extirpate the head of the bone.

Operation.

The patient should be seated on a high chair, or,

what is better, supported in a standing posture. The arm should be held near, but not quite close, to the side. The fore-arm should be between pronation and supination; the whole arm rotated slightly inwards, and the outlines of the deltoid muscle brought fairly into view.

These preparatory measures having been taken, make an incision, with a large scalpel, from a spot opposite to the coracoid process, downwards along the anterior border of the deltoid, round and upwards along the posterior border to a spot level with the joint. Dissect up the deltoid muscle and integuments together (taking care not to wound the long and short head of the biceps), and bring into view the head and neck of the humerus. If there be bleeding from small vessels, let assistants make pressure with the finger's point. Now extirpate the head of the bone, according to the nature of the fracture, and most carefully remove all portions of cancellated structure. Cleanse out the joint, and secure all bleeding arteries. Lastly, return the flap, and dress on common principles. The arm must be well supported, but the humerus must not be lifted towards the glenoid cavity. The muscles themselves will draw up the bone as the healing process goes on, and adapt themselves to its shortened condition. Motion must be as far as possible prevented until the wound heals, after which passive motion may be commenced with, and continued until a good and serviceable arm remains to the soldier.

CASE LXI.—*Gun-shot Wound of the Upper Arm.*

In a very large proportion of cases loss of limb is the inevitable consequence when the humerus is broken by a musket-bullet. In every instance now before us, the bones were comminuted—smashed; and although the soft parts were little torn, the arterics and nerves untouched, still in all it was absolutely necessary to amputate. If you do not cut off the arm, long-continued suppuration will cut off the patient.* Amputate as at Case XXXI.

CASE LXII.—*Gun-shot Wound of the Elbow-joint.*

Gun-shot wounds of the elbow-joint generally demand amputation.† When the articulating extremity

* During our first advance upon Mooltan, a native officer was wounded as above, so severely, that I at once proposed to amputate. The patient, however, could not be induced to submit; but rather entreated me to save his arm. Being willing to do something for him, I cut down upon the fraeture, removed a great many pieees of bone, and sawed off the ragged ends of the humerus. The patient was delighted, and really appeared to be doing well, for three or four days. Destructive suppuration, however, soon set in, becoming daily more profuse, and I barely saved his life by operating at the shoulder-joint. If he had submitted in the first instanee, I doubt not he would have reeovered in a very short time.

† In Major Edwardes's second battle with the Sikhs, one of

of one bone only is crushed, extirpation of that extremity should be practised, as our example fully shows. The bullet passed through the condyles of the humerus, fracturing them into many pieces. The radius and ulna, the principal artery, veins, and nerves, have escaped; the condyles of the humerus alone are injured. Soft parts are not extensively torn. The case affords a fair opportunity for excision of the joint.

Operation.

Place the patient in a favourable position, with the arm bent, and commence the operation by making an incision from a spot two inches above the internal condyle, posterior to the brachial artery, to a corresponding spot two inches above the external condyle. First carry the knife downwards to the internal condyle; then outwards over the extremity of the olecranon process of the ulna, to the external condyle; and lastly, upwards to a spot already marked on the outer side of the arm. Dissect back both skin and muscle—carefully avoiding the ulnar nerve, which must be turned aside—to the necessary extent, and bring into view the

his best officers was badly wounded in the right elbow-joint. I saw him a few days after, when suppuration was profuse. The articulating extremities of the humerus, radius, and ulna, were all exposed to view,—the latter two broken. The patient would not hear of amputation, or even of extraction of detached portions of bone, but left camp in disgust of the European doctor. He recovered, with a useless arm. (See Major Edwardes's "Year in the Punjaub.")

fractured portions of bone ; remove them carefully with forceps ; pass a broad spatula underneath the ragged end of the humerus, to guard against injury to soft parts, and saw it off. Place the arm in a bent position on a pillow, apply cold lotions, give calomel and opium, and strictly adhere to the antiphlogistic treatment.

When the wound has completely healed, very gentle passive motion may be used. If, however, it occasions pain, and a tendency to inflammation, it must be discontinued for a time, and returned to with very great caution, to be again relinquished according to circumstances. Ultimately, by these means, a useful arm will remain to the patient.

CASE LXIII.—*Gun-shot Wound of the Fore-arm.*

So far we have seen that the musket-bullet, when propelled by powder, is very destructive of life and limb. Alas ! a very small proportion of its wounds admit of complete recovery. The fore-arm, however, is by no means so readily destroyed by it ; indeed, except when both bones are broken and comminuted, it is rarely necessary to amputate. When one bone only is concerned, wait until suppuration be fully progressing, and then be guided by circumstances.

CASE LXIV.—*Gun-shot Wound of the Wrist-joint.*

I have never seen a reparable gun-shot wound of the

wrist-joint,—I mean where the bullet has passed into or through the articulation.

In our example the shot passed clean through the joint, nearly detaching the hand from the arm. It would be idle to do aught but amputate. The wrist-joint and hand cannot be saved. Do not (for reasons before assigned) operate just above the joint; rather do so below the pronator radii teres, as shown at Case XXXI.

CASE LXV.—*Gun-shot Wound of the Hand.*

These wounds are extremely painful, and slow to heal: they are, moreover, somewhat dangerous, and difficult to manage. In the case we now treat of, the ball passed through the hand, between the metacarpal bones of the middle and ring fingers, fairly splitting the hand. The flexor tendons of the ring, and the extensor of the middle finger, are cut through; the metacarpal bone of the last chipped, but not fractured.

Treatment.

Place the hand and arm prone upon a pillow; bring the fingers into line, and carry a band of plaster round, to prevent their spreading out. Restore lacerated soft parts as best you may, and apply lint dipped in Tr. Opii, or the lotion F. 25, to each wound, and warm water over all,—to be changed occasionally for poultices. Do not on any account insert sutures, or apply tight plasters or bandages. Examine and clean the

wounds daily, and remove detached sloughs. Let the general treatment be antiphlogistic and palliative. Attend to the state of the liver and bowels; and remember that these wounds, as well as those of the foot, are now and then followed by that dreadful malady, tetanus.*

In all cases be not in a hurry to cut away structures; wait, and let your operations be secondary. Wounds of the fingers may be dealt with summarily, according to their nature and severity.

* My friend Major Edwardes was wounded in the right hand, as I have described above. He was drawing a large pistol into his belt by the muzzle, when it exploded, and the whole charge passed through his hand,—powder, wadding, and ball. When I saw him some days after the accident, I found him suffering from great general irritation and local pain, with the hand sown together with coarse string. Who shall say our gallant countryman did not marvellously escape that appalling disease, tetanus?

CHAPTER III.

TREATMENT OF PUNCTURED WOUNDS.

THE treatment of punctured wounds differs so slightly from that of gun-shot, that it will not be necessary for us to give many examples. A few, however, need especial notice.

CASE LXVI.—*Punctured Wound of the Tongue.*

This organ is not unfrequently wounded by the thrust of the sword, lance, or bayonet, in every hand-to-hand encounter, and hæmorrhage of a serious nature is the consequence.

Our example presents a wound on the left side of the tongue, passing through from below upwards. There is considerable arterial hæmorrhage.

Treatment.

Draw out the organ by means of a hook, or a thread, passed through it. Pinch the tongue, above the wound, with a flat pair of forceps, until bleeding ceases. Quickly sponge out the wound, dry it, and apply nitrate of

silver freely over its whole surface. Now allow the tongue to return into the mouth,—to be again drawn out, and treated as before, if hæmorrhage returns. A ligature will occasionally suffice, especially when the wound is near the tip. Often, however, neither ligatures, nitrate of silver, nor any other styptic, will succeed; nothing but the actual cautery—the red-hot iron itself—will do. It should be applied firmly to the surface of the wound, until bleeding be wholly and effectually stopped: after which a piece of lint, the size of the wound, may be placed upon the eschar, and allowed to remain. The patient must be forbidden to talk, or swallow often. His food must be of a fluid character. These means will scarcely ever fail. Ligature of the lingual artery in the neck is out of the question.

CASE LXVII.—*Punctured Wound of the Neck.*

Every practical surgeon knows how fearfully fatal these wounds are. The reasons are too apparent to need comment. These wounds go into extremes: when severe they are sooner or later mortal,—when *not* mortal they are very slight. The surgeon has, therefore, little to do with them. Ligature of the common carotid would, indeed, occasionally save life; but where is the surgeon to perform the operation? Where? Alas! how many fine fellows die without an attempt being made to save them. If, however, the

surgeon be within call, and a chance remains of saving life by tying the carotid artery, he should immediately perform that operation.

Operation.

Place the patient on his back, with his shoulder slightly raised; throw back the head, and turn it slightly to the opposite side, in order to put the sterno-mastoid muscle on the stretch. Make an incision two inches and a half in length along the inner border of that muscle, and cut through skin, platysma myoides, and superficial fascia. Now, with the handle of the knife, turn aside the small veins that here abound, together with areolar tissue, and expose the omohyoideus muscle where it crosses the carotid sheath. Divide carefully the deep fascia below the margin of the muscle, and bring into view the sheath of the vessel. Lift up a portion with a forceps, and open it, keeping the edge of the knife from the artery. Lastly, pass the ligature round the vessel from without, avoiding the vein, pneumogastric, and descending noni nerves. Dress lightly, enjoin rest, and forbid all stimulating food and drink. In India, in *any* hot climate, attend to the condition of the bowels and liver after ligature of arteries: they are very apt to get out of order.

CASE LXVIII.—*Punctured Wound of the Chest.*

The treatment of gun-shot wounds of the thorax will properly apply to punctures of this region. The

wound must not be closed, but rather left open for the escape of fluids. If an intercostal artery be divided, and hæmorrhage cannot be restrained by pressure, or the vessel reached, I believe a small portion of a rib should be removed by means of Hey's saw or pliers, in order to get at the bleeding artery. The patient should lie as much as possible on his wounded side, and be kept profoundly quiet.

CASE LXIX — *Punctured Wound of the Abdomen.*

Here the treatment of gun-shot wounds of the belly will apply. In our example the small intestines protrude in a bunch as large the fist, and cannot be returned: they are strangulated. The wound must be enlarged sufficiently to admit of their return to the abdominal cavity. The intestines themselves are not wounded.

Operation.

Place the patient on his back, with the recti muscles relaxed. Let an assistant gently press the protruded bowels downwards so as to bring the upper margin of the wound into view. Pass a director between it and the bowel, and along its groove a hernia knife or probe-pointed bistoury, and cut upwards until the stricture be sufficiently relieved. Return the intestines seriatim, and without force. As the intestines are not dirty, do not sponge them or apply water; put them back as

they are, and quickly close the wound ; place a compress of lint upon it, supported by a lightly applied bandage, and let the general treatment be strictly in accordance with that laid down at Case XLVI.*

CASE LXX.—*Punctured Wound of the Bladder.*

The weapon entered the cavity of this viscus above the pubis, of which the escape of urine by the wound, and blood by the urethra, are proofs sufficient.

Treatment.

Immediately introduce a gum elastic catheter, and retain it in the bladder by means of tapes, allowing the urine to dribble away as fast as it is secreted. Place the patient on his back with his legs drawn slightly up, and administer the following :—

R Pulv. Opii, gr. ij.

Statim sumend.

which may be repeated in six hours. Keep the patient at rest, and if there be thirst let him take a mouthful of acidulated barley-water occasionally ; otherwise neither food nor drink should be given for the first

* When intestine is only slightly torn it must be returned into the abdomen ; when much lacerated it should be returned to the mouth of the wound, and be permitted to hang from it. There is no other course.

twenty-four hours. The subsequent treatment must be regulated according to circumstances.

When the bladder is wounded by the bayonet per perinæum, and there be reason to fear extensive extravasation of urine, an incision must be made as in the lateral operation for stone, on the right or left of the raphe according to the position of the wound. The knife should be carried into the bladder itself if extravasation be very extensive.

CASE LXXI.—*Punctured Wound of the Rectum.*

In this case the sword's point passed on the outer side of the anus, and entered the rectum two inches above the sphincter. You ascertain the direction and depth of the wound by means of the finger or straight sound.

Treatment.

Introduce the left index finger into the rectum per anum, and a probe-pointed bistoury per vulnus; place the point of the finger upon that of the knife, and withdraw them together, precisely as in the operation for fistula in ano. Hæmorrhage must be restrained by pressure. It is unnecessary to introduce lint into the wound. The bowels are to be kept gently open, and the rectum should be cleansed now and then by the injection of warm water. Opium will allay pain and irritation. It is apt, however, to confine the bowels.

We may now pass to

PUNCTURED WOUNDS OF THE EXTREMITIES.

A few will illustrate the subject.

CASE LXXII.—*Punctured Wound of Parts about the Groin.*

The reader has doubtless heard it said,—“Poor ———— was killed by a stab of the bayonet in the groin.” He was, in fact, killed by a punctured wound of the femoral artery just below Poupart’s ligament. Many soldiers die of such wounds in every general action. There is, alas! no hope of saving them, as the medical officer is nowhere at hand. The only means of preserving life is by making instantaneous pressure on the bleeding vessel as it passes out of the pelvis, and then of tying the external iliac.*

Operation.

Supposing the wound to be upon the left side, place the patient on his back, turned slightly on to his right side. Now make a curved incision four inches in length, half an inch above and in the course of Poupart’s ligament, and cut down to the tendon of the external oblique muscle. Divide this tendon to the same extent,

* If there be sufficient room, of course the femoral vessel must be tied above and below the wound. To tie the external iliac is the last resource.

and bring into view the free border of the internal oblique and transversalis muscles ; detach these from Poupart's ligament. Tear through the internal abdominal fascia with the handle of the knife ; also the cellular tissue. Introduce the finger, and feel for the artery which runs along the brim of the true pelvis. Scratch through the fascia that surrounds the artery, turn aside the areolar tissue and glands, and bring the vessel into view. Lastly, carry the charged aneurism needle round it from without, and tie the artery firmly, taking especial care not to injure the iliac vein. After-treatment according to circumstances.

CASE LXXIII.—*Punctured Wound of the Hip-joint.*

You have reason to suppose from the position and direction of this wound that the weapon entered the hip-joint ; also from the exquisite pain occasioned by the slightest motion of the thigh.

Treatment.

Use the greatest care in conveying the patient to bed ; put him into the most easy posture. Support the thigh and leg with pillows, but do not apply a splint. Take blood from the arm until the patient nearly faints. Administer the following :—

R Hydrarg. Chloridi, gr. v.

Pulv. Doveri, gr. x.

Statim : et

R Misturæ Salin. fʒij.

Quartâ quaque horâ.

The alvine evacuations must be diligently looked after, and the bowels kept gently open. Enjoin low diet, rest of body, and mental repose. The slightest motion of the wounded hip-joint must, as far as possible, be forbidden.

CASE LXXIV.—*Punctured Wound of the Thigh.*

The weapon in this instance entered the thigh over the course of the femoral artery, about the junction of the upper with the middle third. There is tremendous hæmorrhage, of an arterial character, unquestionable evidence of wound of the femoral artery; and death will be the result if it be not instantly checked.

Treatment.

Apply, upon the spot, above the wound, either a handkerchief, belt, sash, piece of rope, or cloth, tightened by means of a stick, pistol, or bayonet; or make firm pressure on the femoral artery as it emerges from beneath Poupart's ligament until bleeding be arrested, and time given for the application of a tourniquet.*

* At the battle of Soorrajkoond I for the first time checked hæmorrhage from the femoral artery by means of a stick and kerchief.

Now make an incision of sufficient length over the wound in the course of the artery ; dissect down to it, and very carefully examine whether the femoral vein be divided or not. As it is not injured, apply a ligature to the artery above and below the wound ; dress, keep the patient at rest, maintain the temperature of the limb, treat symptoms, and he will probably soon recover.

If, on the contrary, however, the femoral vein be also divided, then amputation, and amputation *alone*, must be resorted to ; nothing else will save the patient's life. Let it be performed as described at Case XX. This is a painful duty, no doubt ; a duty which the poor patient will not readily understand. We should spare no pains in convincing him of the utter hopelessness of his recovery if amputation be not done,—in assuring him that it is his only chance.

CASE LXXV.—*Punctured Wound of the Popliteal Space, with Wound of the Artery.*

This is one of the most serious wounds of arteries,—one of the most dangerous and difficult to treat. Concerning this wound I have heard some strange things,—some very strange things ; and shall possibly hear many more if I live to return to scenes where such wounds are likely to be plentiful.

Now, I consider that every conscientious surgeon has an unquestionable right to act according to the best of his judgment in regard to this and every other

wound. But I must entreat my younger brethren to think before they act; and I take this opportunity of assuring my friend ——— that a wound of the popliteal artery is a very serious business,—so are wounds of arteries generally, and the treatment of them a serious business too. Pressure judiciously applied is undoubtedly a very efficient means of arresting hæmorrhage, and I can truly say I have succeeded beyond my expectations in checking bleeding by it. But he is wholly wrong in thinking it will answer in every case, as he will assuredly find when called upon to act on the field of battle.

But, to return to our example, which we find to be a wound of the popliteal artery, indicated by profuse discharge of florid blood from a wound in the popliteal space.

Treatment.

Speedily apply a tourniquet over the femoral artery, and screw it tight enough not only to stop the flow of arterial blood, but also to prevent the return of venous blood by the femoral vein. Now carefully notice whether venous blood escapes also, and in sufficient quantity to indicate a wound of the popliteal vein. If there be sufficient reason to conclude that both artery and vein are wounded, then you must amputate the limb, as shewn at Case XX. If, on the contrary, the artery alone be injured, then ligature of the femoral artery is the proper course.

Operation.

Place the patient on his back. Turn out the thigh, and slightly bend the leg. Make an incision four inches in length, beginning two inches below Poupart's ligament, in the course of the femoral artery, and bring the fascia lata into view. Divide this fascia to the same extent, and expose the sartorius muscle. Turn this muscle somewhat outwards, scratch through the cellular tissue beneath it, and reach the sheath of the vessel. Lift a portion, and divide it with a touch of the knife. Enlarge the opening with the handle sufficiently to admit of the easy introduction of the aneurism needle. Pass the ligature from within, and securely tie it round the artery. The internal saphenous vein, the long saphenous nerve, and the femoral vein, are to be avoided. Small glands to be turned aside with the handle of the knife.

After tying the femoral artery, carefully bring the lips of the wound in the popliteal space together; apply a firm compress and a bandage; raise and support the leg and thigh with pillows. Diligently watch the patient, and treat symptoms.

CASE LXXVI.—Punctured Wound of the Knee-joint.

This is also a very formidable wound. The weapon passed into the articulation by the side of the patella, and appears to have gone some distance between the

bones, occasioning severe pain, sickness, and faintness. The external wound is about an inch in length, and discharges a little synovia mixed with blood.

Treatment.

When the knee-joint is fairly entered by the point of a lance, sword, or bayonet, it would undoubtedly be the safer, perhaps the only proper course, immediately to amputate.

Surgeons are, however, naturally averse to amputation, and desirous of doing their best to save the leg. Patients are still more averse to the operation; indeed, they will not readily submit,—nay, they will rather undergo any amount of suffering. It is our duty, therefore, to strive to save both life and limb.

Place the patient on his back, and apply a splin immediately behind the knee in order to fix the joint. Bring the edges of the wound together with short strips of plaster; put lint dipped in blood over the wound, and very thin linen dipped in the following:—

R Liq. Plumbi Diacetatis, ℥ss.

—— Ammoniæ Acetatis, ℥ij.

Spt. Vini Rectific. ℥j.

Aquæ Frigidæ, ℥v.

M. Lotio.

over the surface of the joint.

Next lift the patient into the sitting posture, and

Fiat venæsectio, ℥xv.

vel ad deliquium animi.

Now administer

℞ Hydrarg. Chloridi, gr. vj.
 Pulv. Antim. Potass. Tart. gr. $\frac{1}{4}$
 statim, et post horas duas
 ℞ Magnes. Sulphatis, ʒvj.
 Acidi Sulphurici Diluti, mxx.
 Ex. Aquâ, ʒiv.
 Mist. ft. Haustus. Quoque
 ℞ Hydrarg. Chloridi, gr. xij.
 Pulv. Ipecac. Vin. gr. viij.
 ——— Opii, gr. ij.
 Misce bene et fiat Pil. vj. ; capt. j. sextâ quaque
 horâ.

The diet must be scanty, and of a vegetable nature ; the drink water, barley water, or the nitric acid mixture, F. 18.

The patient must be diligently watched, and the slightest untoward symptom combated. If, however, notwithstanding our best endeavours, the joint becomes much swollen, painful, and red,—the pulse quick, small, hard, and jerking,—the tongue dry and coated, with general feverish symptoms,—then amputation must be performed as the last resource, bad although the prognosis may be.

CASE LXXVII.—*Punctured Wound of the Leg.*

This wound is situate about the middle of the leg, and presents an example of punctured wound of the

posterior tibial artery. The blood flows per saltum in considerable quantity, and will destroy life if it be not speedily checked.

Treatment.

The first thing to be done is to apply a tourniquet to the femoral artery, in order to stop the immediate flow of blood; the next, to apply a ligature to the artery above and below the wound. In these cases it should always be done. You have not the same difficulties to contend with as in laceration of the artery by a bullet. By a ball the artery is torn sometimes at a great distance from the external wound, and you cannot, without producing great mischief, find the vessel. In puncture, the wound itself will lead you to the artery, if sufficient care be taken. Even here, however, it is not very easy to tie the posterior tibial. The muscles become very irritable, and retract spasmodically, rendering it necessary to proceed very carefully and slowly with the steps of the operation. Especially endeavour not to pass the artery, and relax the gastrocnemius muscle as much as possible by flexing the leg upon the thigh and extending the foot.

CASE LXXVIII.—*Punctured Wound of the Ankle-joint.*

What has been said relative to punctured wounds

of the knee-joint will properly apply to this. The wounded limb must be placed on the outer side upon a raised pillow, and measures taken to prevent motion of the joint. A splint cannot be effectually applied to the joint itself without producing pain, but a stick carried from the ball of the great toe to the inner side of the knee answers very well.

CASE LXXIX.—*Punctured Wound of the Foot.*

Punctured wounds of the foot are not immediately dangerous to life. When bleeding attends them pressure will generally suffice to restrain it. In our example the weapon completely transfixes the sole of the foot, passing through from side to side. Hæmorrhage is trifling, but pain and irritation very severe.

Treatment.

If the patient be a strong man, it is well to take twelve ounces of blood from the arm. Administer opium until pain be considerably relieved; give it combined with calomel:—

℞ Hydrarg. Chloridi, gr. vj.

Opii Pulveris, gr. ij.

statim, et repetatur sine Hyd. Chloridi post horas
sex; sed adde

Pulv. Ipecacuanhæ, gr. ij.

Do not omit the ipecacuanha, as it acts very favourably

upon the mucous membrane. Saline aperients are to be ordered if the bowels be confined, but not otherwise. Rest the foot on the outer side, and at once apply a large warm poultice, in order speedily to induce suppuration. Examine the wound daily, and let out any matter that gets lodged. Cut in the course of vessels, tendons, and nerves.

CHAPTER IV.

INCISED WOUNDS.

It is not necessary, neither can we stop, to describe a great number of these injuries.

In Indian warfare they are exceedingly common. The Sikh and Affghan prefer the curved sword (always excepting the great gun,) to any other weapon ; and they use it with terrible effect, making most ghastly wounds. They do not strike directly downward as we do with the sabre, but they draw and strike together, and consequently occasion incisions of wonderful extent.

CASE LXXX.—*Incised Wound of the Scalp.*

In this instance the patient was most effectually scalped,—a portion of the integuments three inches by two and a half being cut clean off, leaving the vertex of the skull completely bare. There is some bleeding, which pressure will check. This patient had six other severe incised wounds.

Treatment.

Cut and shave off the hair completely around, thoroughly cleanse the wound from all foreign matter, put lint dipped in blood upon it, and a wetted compress over. Apply a bandage, and keep the patient at rest, with the head raised. Give calomel and purgatives, and bleed fully if there be a tendency to cerebral excitement or inflammation. On the second or third day remove the dressing; apply warm water. Lastly, to complete the cure, substitute the bark ointment, F. 33.

CASE LXXXI.—*Incised Wound of the Skull.*

The subject of this injury, a young native officer, served under Major Edwardes on the Indus, and was wounded in his second battle with the Sikhs. I removed various pieces of bone, and he ultimately recovered.

The cut lies at the back of the head, running from the vertex to the occiput, and is four inches long. Introduce the finger, and you find a deep fissure in the cranial tables. The patient does not evince pain or constitutional disturbance. It is fair to infer that the brain is untouched.*

* This is not certain evidence, as I have seen the brain deeply wounded without any apparent symptoms.

Treatment.

Do not meddle much with the wound, as rough manipulation speedily induces irritation.

Shave off the hair, and if there be a clot of blood within the wound turn it out with the finger; then, quickly placing a hand on each side of the wound, gently press its lips together; apply strips of plaster *crosswise*, leaving interspaces for the escape of fluids. Do not on any account apply ligatures or sutures. Pressure will suffice to check bleeding, and should be made with compresses and bandages. Cold lotion, cold and warm water, should not be immediately applied to recent scalp wounds, as it occasions irritation, and prevents union by the first process. After a day or two warm water is the best application. The wound must be examined daily, and any accumulation of matter gently pressed out. General treatment must be strictly in accordance with symptoms.

When in very severe wounds of this nature a portion of brain protrudes, pressure should be made, and a strong solution of alum and opium or lime water applied, or the protruded brain may be shaved off, and pressure again applied. This is the sum total of the treatment. The prognosis is most unfavourable.

CASE LXXXII.—*Incised Wound of the Face and Neck.*

On the whole, this was the most ghastly cut I ever

had to deal with. It presented so shocking an appearance, that General Courtlandt, whose attention I drew to the case, could not bear to look at it. The tulwar (sword) in its course cut off the ala of the right nostril, shaved the malar bone, severed the lobe of the right ear, grazed the rami of the jaw, exposing the teeth, turned into the neck, and terminated in front at the sternal end of the clavicle, behind at the spinous processes of the cervical vertebræ, laying three of them bare. The wound was not deep, but it presented a very large surface; the flap of skin and muscle hanging literally down upon the shoulder and chest.*

There was a good deal of bleeding in the first instance, which was checked by gunpowder.

The patient does not appear to suffer much; his general system is little affected.

Treatment.

Having thoroughly freed the wound from extraneous matter, quickly return the flap; that is, roll it back into its place, making firm pressure, as you ascend, with the palms of the hands. Neatly adjust its edges, introducing ten or a dozen sutures. Apply many lengthy strips of plaster, and a large compress with bandages to support the whole. Do not tie the bleeding vessels, as the ligatures, running great distances through the wound, will occasion irritation and pro-

* This patient had a very severe wound also in the right thigh. Both wounds were filled with gunpowder and dung. He completely recovered.

longed suppuration ; besides, pressure will readily check hæmorrhage. The treatment generally must be carefully attended to, and the condition of the digestive organs inquired into, as the liver and bowels are prone to get out of order. I need hardly say, that the diet must be regulated by symptoms.

Transverse incised wounds of the neck are for the most part fatal. When the pharynx is laid open, the wound must not be closed, but allowed to heal by granulation ; and the patient must be fed with fluids through a tube.

CASE LXXXIII.—*Incised Wound of the Chest.*

This wound, seven inches in length, extends obliquely across the left breast, going down to the ribs, two of which are wounded. I saw this officer on the instant ; there was much bleeding, and he fainted as he reached the lines.

Treatment.

Sweep out the coagulum of blood, and, placing a hand on either side of the wound, steadily and firmly press its lips together. Insert four sutures ; apply plasters, compresses, and bandages. Bring the arm to the side, and carry the fore-arm across the abdomen, between pronation and supination. The arm must be kept motionless. Place the patient in an airy but dark situation ; command rest, low diet, and cold saline

drinks. The dressings are to be changed in three days, taking care not to reopen the wound. I mention this case, in order to show that ligatures should not be applied to arteries where pressure will suffice to stop bleeding. A ligature in a wound is a great source of irritation, and greatly interrupts the healing process.

CASE LXXXIV.—*Incised Wound of the Abdomen.*

Here the unfortunate sufferer's intestines protrude, and are, moreover, badly wounded. The patient lies prostrate, in extreme collapse, with slow, sighing, thoracic breathing, and sinking pulse. Death is inevitable, but life may be prolonged for some hours, which is all important.

Treatment.

Place the patient on his back, with his shoulders raised, and his legs drawn up. Quickly return the intestines, close the wound, and pass a bandage several times round the abdomen, to support it. Apply warmth to the feet, and turpentine on lint to the scrobiculus cordis. Administer frequently

R Spt. Æther. Sulph. Comp. ʒij.

Mist. Camphoræ, ʒviij.

Ft. Mist. capt. cochl. ampl. iij. singulis quadrantibus horæ.

Put the patient in a light and airy position, and cover him well with cloths.

CASE LXXXV.—*Incised Wound of the Abdomen.*

This wound is situate in the left lumbar region, and a portion of colon protrudes. There is a clean cut in that bowel, two inches in length.

Treatment.

Bring the wound in the intestine neatly together by the continued suture. Cleanse the bowel, and return that portion last which protruded first. Close the wound in the abdominal parietes with sutures, plasters, a compress and bandage. Turn the patient a little towards his sound side, and support him well with pillows. Enjoin profound repose. Do not give either medicine, food, or drink, for the first twenty-four hours. If, indeed, there be muscular spasm and much pain, two grains of solid opium may be administered. The after-treatment will entirely depend on circumstances.

CASE LXXXVI.—*Incised Wound on the External Aspect of the Thigh.*

A longer incised wound than this I have never seen. It extends from the great trochanter to the head of the fibula, penetrating in several places down to the femur. The patient does not evince much constitutional disturbance, neither is he in great pain.

Treatment.

Little need be said here. Support the limb on the inner side with pillows; bring the wound together; apply a wetted bandage from the knee to the groin; and do not apply ligatures. Adopt the antiphlogistic form of treatment.

CASE LXXXVII.—*Incised Wound on the Inner Aspect of the Thigh.*

This is a wound of a very different character to the last. That was external, longitudinal, and not dangerous; this is internal, transverse, and almost always mortal. Indeed such wounds are only met with by those surgeons who accompany their regiments into action. The wound is situate on the inner side of the thigh, and all structures are divided down to the bone, including the femoral artery and vein. Hæmorrhage was of course tremendous, and would soon have caused death, but for the timely application of a sash and stick.

Treatment.

When the patient is in a fit condition, amputation must be performed as described at Case XX. There is nothing else to be done.

CASE LXXXVIII.—*Incised Wound of the Knee-joint.*

Very few incised wounds of the knee admit of repa-

ration. They must, indeed, be very slight to allow it ; and I have not met with a single ease. Amputation is commonly the only means of saving life. I have known, in two instances, an incision not an inch in length occasion death. The slightest cuts into the knee-joint demand the most careful attention.

Treatment.

Quickly close the wound, applying lint dipped in blood. Place the limb upon a splint ; apply cold ; forbid the slightest motion of the joint ; and put the patient in a dark situation. Calomel and opium, antimony and ipecacuanha, saline purgatives and drinks, together with bleeding, leeching, and cupping, must be resorted to as occasion may require.

CASE LXXXIX.—*Incised Wound in the Calf of the Leg.*

I here present another example of transverse incision, with all its painful consequences. We find the wound running across the calf of the left leg, and penetrating through all soft parts down to the bones : integuments, muscles, veins, nerves—all are severed. The leg must inevitably be severed too, in order to save life. If there be not room below the knee, amputate above, as shown at Case XX.*

* In this very case I endeavoured to convince my patient of the absolute necessity of amputation ; nevertheless, he would

CASE XC.—*Incised Wound of the Ankle-joint.*

Incised wounds of the ankle are not often occasioned without much force ; they consequently render amputation necessary. If it be determined to save the joint, the treatment must be strictly in accordance with that laid down for similar wounds of the knee. Above all things measures must be taken to fix the joint, and prevent the slightest motion.

CASE XCI.—*Incised Wound of the Shoulder-joint.*

There are no parts of the soldier's body so much exposed to the trenchant sword as his upper extremities. I can safely aver, that in all our hand-to-hand encounters with the Sikhs, four-fifths of the men killed or wounded with the sword presented smaller or greater cuts in their shoulders and arms. In striking either right or left with the sabre, although you direct the blow at your enemy's head, it most often falls upon his shoulder.

A few days after I took medical charge of Major Edwardes's troops before Mooltan, Moolraj attacked a party sent out to guard our camels to their feeding

not submit. Whereupon I did all in my power to save his leg, but without avail : mortification speedily set in, and he died on the fifth day.

ground. He captured the camels, and killed or wounded nearly every man forming the escort. Of sixteen who were brought in wounded with the sword, two-thirds presented cuts in their hands, arms, and shoulders.

CASE XCII.—*Incised Wound of the Shoulder-joint.*

The deltoid muscle is in this example cut clean across, the insertions of the spinati and teres minor muscles divided, and the joint laid fairly open. The arm hangs powerless by the side, and cannot be lifted up by the greatest effort of the patient.

Treatment.

Apply ligatures to the truncated arteries, in order to prevent the further escape of blood into the joint. Quickly cleanse the wound with a well-pressed sponge. Water (especially that you are wont to get in field-hospitals) is very irritating to open joints. Lift up the arm to a right angle with the body, and support it in that position in the best manner possible. Insert four sutures, and apply four or five strips of plaster obliquely, supporting each other. Carry a wetted bandage over all, and keep it moist. Let the lancet, calomel, antimony, salines, purgatives, &c. be held in readiness to meet inflammatory symptoms. Enjoin quietude and low diet, and the soldier will recover and be able to wield the sword again.

CASE XCIII.—*Incised Wound on the Inner Aspect of the Arm.*

When the soft parts on the inner side of the upper arm are divided, including the vessels and nerves, it would be idle to attempt to save the limb. Amputation must sooner or later be performed. It is the better practice to do it at once. A wound of this kind is generally received when the soldier is in the act of striking, with the sword upraised. Patients often die upon the spot from loss of blood.

CASE XCIV.—*Incised Wound of the Elbow-joint.*

This injury is situate at the back of the articulation, and the olecranon process of the ulna is cut clean across. The ulnar nerve is also divided, and the joint laid open. It would be safe to amputate; but patients will not submit for (what they consider) so slight a wound. You must consequently stretch out the arm, place it upon a pillow, bring the divided structures into close contact, apply plasters, lint dipped in blood, a bandage and warm water over all, and treat the case on the general principles shown at Case LXII.

CASE XCV.—*Incised Wound in Front of the Elbow-joint.*

As all the structures on the anterior aspect of the

articulation are divided, nothing remains to you but to amputate. If there be integument sufficient behind the joint to cover the condyles, operate at the joint itself; if not, amputate above, as described at Case XXXI.

CASE XCVI.—*Incised Wound of the Fore-arm.*

I shall not present special examples of these lesions, as we may very well sum up in a few words all that need be known for immediate practical purposes. In the first place, then, let us remember what has before been said relative to wounds of the fore-arm, namely, that they admit of repair when similar injuries in other parts of the body would assuredly cause death, or loss of limb. The fore-arm is in a very remarkable manner supplied with blood, flowing to and from it by numerous deep and superficial vessels; so that, one being obstructed, another carries on the circulation. It is also abundantly supplied with nerves and nervous influence: moreover, it has two strong bones, which ably support each other in injury and disease; wherefore amputations should not be performed without good and sufficient reasons. When arteries are wounded, they should be tied above and below. When nerves and tendons are cut through, they should be carefully reunited. When muscles are divided, they should be relaxed and brought into close contact. When bones are severed, their truncated ends should be made to

meet; and when comminuted, detached portions should be removed. The arm must be placed upon a pillow, either prone, supine, or between the two, and flexed or extended upon the humerus, according to the position, direction, and nature of the wound.

CONTUSIONS.

CONTUSIONS, or bruises, although they be far less noxious to life than most of the foregoing lesions,—although they be far less destructive of limb, and less apt to leave offensive cicatrices and inconvenient distortions,—are, nevertheless, sufficiently important to demand the surgeon's early and attentive consideration—his prompt and judicious treatment.

I have seen strange things enacted, both by professional and non-professional men, in regard to these injuries; and the most absurd measures adopted by the natives of India.

Common superficial contusions, slight cutaneous bruises, may very well be left to the *vis medicatrix naturæ*, and a little abstinence for a day or two; but contusions on the field—contusions by the spent round-shot—need something more than this, as may perhaps be learned from a brief enumeration of their symptoms and effects, namely, concussion and compression of the brain; extreme collapse; paralysis; rupture of important arterics; pain, heat, redness, swelling, and ecchymosis; inflammation of, and effusion into, serous

membranes; inflammation of viscera; retention of urine; inflammation of joints; sloughing; hæmorrhage; indolent, unhealthy ulcers; and oftentimes speedy dissolution.

This is, in very truth, a formidable list of abnormal conditions, which nature herself (although powerful) cannot overcome. Nature and art combined are not always competent to the task; nevertheless, we have good and efficient remedies, which need only to be well applied often to succeed.

I consider curative means well applied when they strictly co-operate with the healing powers of nature; and I consider that treatment judicious, which is strictly regulated by symptoms,—consequently a general summary of remedies must be vague and unsatisfactory. We may treat disease generally in books; we can rarely do so in practice. Indeed, this method of proceeding is the worst kind of empiricism. No doubt there are generalities relating to every lesion of the human body; and, as far as I know, the following are those which appertain to contusions:—

The primary indications are to save life, and to rouse the patient from that form of collapse which follows, for instance, a severe blow upon the stomach. General and local warmth; frictions with the hand; external and internal stimuli; and especially the admission of abundance of air and light, are the means.

The next indication is to obviate inflammation by universal and local bleedings; by the administration of calomel, antimony, and purgatives; also by low

diet. To prevent suppuration by promoting absorption, by cold astringents, and well regulated pressure. To all these ends, rest—profound rest—both mental and corporeal, most powerfully tend; without which, indeed, all measures are of no avail. It is utterly useless to give physic to a patient who is being jolted along a rough road in a rough waggon, or to apply lotions to a badly bruised knee, which cannot be fixed.

Exceptions.—Sometimes it is necessary to promote suppuration, to hasten the formation of pus, and then to make free longitudinal incisions for its escape. Occasionally it is necessary to put a ligature on a considerable vessel, in consequence of rupture of an artery; for instance, to tie the external iliac in case of injury to the femoral. And lastly, it now and then becomes necessary to incise bruised parts, in order to let out coagula; as, for example, when the tumour presses upon the trachea so as to endanger suffocation. To do either one or the other of these three without absolute necessity, is injudicious meddling, and very bad surgery, to say nothing of the danger to life.

The above remarks relate to the whole subject of contusions, and perhaps apply to each individual case. They will not, however, be sufficient for us in practice. We must go a little more into detail, and treat a case or two as if they were really before us, and we ourselves on the plains of India.

Treatment.

The first step is to place the patient in an easy pos-

ture, with the muscles concerned in the injury relaxed, and the bruised part *in situ*. Secondly, to shave off any hair that may be present. Thirdly, to wash the part with vinegar and water. Fourthly, to apply the lotion, F. 26, immediately over the bruise, by thin, old, linen cloth ; it should not be put on very wet, or ever allowed to become quite dry. On the third or fourth day, a bandage wetted with the above lotion should be substituted, and rendered tighter from day to day. When it becomes necessary to change cold water for warm, it should not be done suddenly ; make the change gradatim ; that is, pass to slightly tepid, then to tepid, and so on to warm and hot, *si opus sit*. Leeches should be abundantly applied near and around the contusion, but not immediately upon it. Cupping is not always judicious. General bleeding is of the utmost importance, without which, indeed, it would be scarcely possible in many cases to effect a cure. It should be carried to the verge of syncope, and be repeated again and again, as occasion may be. Calomel should be given as a purge, also after the F. 6 ; together with saline purgatives, F. 12 or 14 ; and saline sudorifics, F. 15. The return of blood to the heart must be favoured in every possible way, and light admitted, or excluded, according to the power of the patient's pulse.

With these remarks I had proposed to leave the subject of contusions ; but two or three cases present themselves to my mind, and appear worthy of special notice, viz. :—

CASE XCVII.—*Contusion of the Abdomen.*

Here the round shot having nearly run its course, struck upon the belly at the umbilicus, and laid the soldier prostrate upon the field; not, however, in a state of insensibility, but rather in extreme collapse. You find him lying in a sleepy state, with short, feeble, thoracic breathing, and scarcely perceptible pulse; his lips look bluish; his face somewhat livid and pinched. The surface of his body is cold, especially his hands and his feet; nevertheless his mental faculties remain undisturbed,—he is capable of speech, and aware of his dangerous condition. This is, then, a case of violent shock to the ganglionic system, and serious interruption to the heart's action.

There is no local evidence of mischief; a little redness only marks the spot impinged upon by the ball.

Treatment.

Remove all tight clothing, and place the patient on his back, with his head and shoulders raised and his legs drawn up. Apply heated bricks in bottles to his feet, and mustard poultices to his legs and thighs; put warm flannels into the axillæ, and lint wrung out of spirit of turpentine over the region of the stomach. Cover up with blankets, and administer by the mouth the mixture, F. 10,

Quâque quartâ parte horæ : et per anum

R Spiritus Terebinthini, f₃ss.

Decocti Hordei Tepidi, f₃vj.

vel Mucilaginis Acaciæ, vel Aquæ Oryzæ, vel Pulmenti, et fiat injectio.

These measures must be persevered with until reaction begins to manifest itself; then relaxed, and ultimately laid aside. The antiphlogistic mode of treatment, regulated by symptoms, must complete the cure.

CASE XCVIII.—*Contusion of the Perinæum.*

In this case the round shot bounding up struck upon the perinæum, and you find the parts, including the serotum, nates, and upper parts of the thighs, much swollen, and, in common parlance, black and blue. The patient lies in a semi-collapse, evincing much suffering, is incapable of micturition, and you notice blood flowing from the end of the penis. This is an example of retention of urine from rupture of the membranous portion of the urethra by a violent blow.

Treatment.

If a bath be procurable, instantly place the patient in it, at a temperature of 96°; it should not be too hot. At least foment with flannels wrung out of warm water, and whilst this is being done bleed from the arm to the extent of sixteen ounces or more, and apply numerous leeches to the perinæum. Give at once

R Hydrarg. Chloridi, gr. j.

Pulveris Opii, gr. ij.

et repetatur dosis post horas duas, si opus sit.

If thirst be pressing, let barley-water be given, to which a little bicarbonate of potash has been added.

R Decocti Hordei, Oj.

Potassæ Bicarbonatis, ʒj.

Dosis ʒiv.

When the system is thoroughly affected by these measures,—that is, locally and generally relaxed,—then introduce a No. 6 or 8 catheter into the urethra, carry it down to the strictured or ruptured part, and if possible into the bladder. Be careful not to use force, as the instrument very readily slips into the cellular tissue, endangering extravasation. Keep the instrument steadily in the median line and in the course of the urinary canal. The urethra must be kept slightly on the stretch—that is, drawn up upon the shaft of the catheter with the left hand, whilst the instrument is pressed forwards towards the bladder with the right.

If after a fair trial (say a quarter of an hour,) the instrument fails to pass, withdraw it, and substitute a catheter, sound, or bougie of the largest size, carry it down to the stricture, and retain it there by slight pressure for five minutes; then withdraw it also, and introduce a No. 3 or 4 catheter, which will seldom fail to reach the bladder. The catheter must be kept in the bladder for twelve hours, and then changed for a gum elastic one of a larger size. This instrument must

be taken out daily, cleaned, oiled, and re-introduced, for ten or twelve days,—after which it may be set aside altogether, as the urinary canal will be re-established, and the patient in a fair way of complete recovery.

If all these means be unavailing, and the bladder cannot be relieved by the catheter assisted by every collateral measure,—if the viscus be greatly distended, and inclination to micturate very pressing,—then an operation must be performed to afford relief. The urinary bladder must be punctured, either per perineum, per anum, or above the pubis. The last-named operation is the easiest of the three, but the result of my experience is not sufficiently favourable to enable me to recommend it. Of the two former methods, I cannot say positively which I consider best, although, on the whole, I am inclined to puncture by the rectum; nevertheless, if there be extravasation of urine, or the slightest suspicion of its escape into the areolar tissue, then an incision must be made into the perineum, and the knife carried into the bladder itself.

Operation.

Tie up the patient as in the lateral operation for stone, and make the usual incision from the raphe to a point midway between the anus and the left tuber ischii; now introduce the finger into the upper part of the wound, (dividing any obstructing fibres with a touch or two of the knife,) and carry it obliquely upwards and backwards towards the bulb of the urethra and arch of the pubis. Now search for the prostate gland,

by the side of which, guided by the finger, the knife must be carried obliquely upwards into the bladder.

*Operation per Rectum.**

Introduce the left index finger into the rectum, and carefully examine the size and relative position of the prostate gland, immediately posterior to which the distended bladder may be distinctly felt. Now carry a curved trocar and canula along the anterior aspect of the finger to a spot half an inch behind the prostate exactly in the median line, and plunge it upwards into the bladder. Lastly, withdraw the trocar and allow the canula to remain.

The method for opening the membranous portion of the urethra is more eligible in cases of old insuperable stricture. In cases of retention from very severe injury it would probably altogether fail, as it would be most difficult to find the course of the urinary canal, the parts about being much smaller, ecchymosed, lacerated, and filtrated with blood.

Operation.

The patient being held in the lithotomy position, introduce a full-sized sound, and pass it as far as possible towards the bladder. Now make an incision an inch or more in length in front of the anus, and

* Mr. Cock, surgeon to Guy's Hospital, has performed this operation often with great success. My own experience leads me to think favourably of it.

directly in the median line. Lastly, cut down upon the extreme end of the sound and carry the knife through the stricture into the distended urethra beyond. A gum elastic catheter must be introduced into the bladder, and kept there until the wound be healed and the urinary passage established. It should be withdrawn every other day, well cleaned, and speedily returned.

CASE XCIX.—*Contusion of the Knee-joint.*

We could scarcely find a more complete example than this. It will, I think, serve excellently well to illustrate the subject of contusions. It was a most severe bruise, and accompanied with fracture. It was occasioned by a spent six-pounder, which the patient was hastening to pick up.* The ball struck upon the left internal condyle, and by some means or other split the tibia obliquely from the knee to the middle of the leg. The joint speedily began to swell, and continued to do so, together with the leg, for some days; and I

* The Sikhs had no means of *casting* iron balls, consequently their shot were all wrought. The iron was very malleable, and very valuable for all purposes, especially for making horse-shoes. We used to give sixpence for a six pounder. The camp followers used to make some money by picking up the enemy's shot; but they sometimes got killed, or very severely wounded, by incautiously approaching a ball before it had completely ceased to roll.

had great doubts of saving my patient. I should perhaps have amputated, but in truth I had had enough of amputations, and was very willing to save the leg. My means were happily successful. The bone united favourably. The swelling daily decreased, and the patient completely recovered. We cannot always expect so favourable a result in contusion of the knee, but this case serves to show that the most severe bruises of that joint do admit of recovery.

MISCELLANEOUS WOUNDS AND DISEASES.

The Bite of the Camel.

The camel (considering the great numbers used in all Indian armies,) does not often attack man. The male at certain seasons of the year becomes vicious, and will then occasionally bite his attendant or driver, inflicting very severe and dangerous wounds. I have known the humerus broken, the radius and ulna dislocated and fractured, and soft parts badly lacerated, by one of these animals. Their slightest bites are not to be lightly considered, as they are apt to occasion severe inflammation and great general disturbance. Bad injuries are often followed by a species of erysipelas, or rather subcutaneous phlegmonous inflammation, which is always difficult to manage,—often wholly uncontrollable.

The general treatment is to guard against this form of inflammation by early depletion,—by restoring the

secretions and excretions,—by subduing irritability by opium and calomel, and local pain by warm opiate fomentations or common poultices. Dislocations are to be quickly reduced, and fractures set. If there be both dislocations and fractures in the same case, together with flesh wounds, then they must be treated in the order enumerated, taking care to bind up the wound before reducing the dislocation.

Tiger Bites.

The bite of the tiger is more terrible and dangerous than that of the camel. This is not, however, to be wondered at, when we call to mind the enormous strength of his jaws and his temporal and masseter muscles, and the great length of his canine teeth. He inflicts desperate wounds also with his claws, with which he strikes and clutches at the same time; that is, at the moment the outstretched paw falls upon its object, a short strong flexor muscle draws forth the hidden talons, and buries them deep in the flesh.

The treatment is the same as that for the bite of camels. When pain and tension are very severe in the wounded part, scarifications give great relief; they should be made with a very sharp scalpel in the course of muscles and vessels, and should penetrate through the skin.* Both Europeans and the natives of India

* Whilst hog-hunting one day upon the Indus, a large tiger charged in amongst us, seized one of my orderlies by the

consider the bite and scratch of the tiger poisonous. I need not stop to refute this notion regarding the *wound*, but I must say it often poisons the patient's *mind*, which renders him very irritable, and increases considerably the danger. The surgeon should endeavour to remove these morbid impressions.

POISONED WOUNDS.

Bite of Snakes, and other Venomous Animals.

In India these injuries are very common and of every degree of severity, from those which are very speedily fatal (for example, the bite of the hooded-snake) to those that occasion slight itching, as the bite of the sand-fly, so common in the Punjaub : this little animal is of a light colour, and so small that it can scarcely be seen with the naked eye.

In a general pathological point of view we may consider these injuries as strictly of the same nature,—that is, the bite of the deadly cobra and that of our little fly. Both induce similar abnormal conditions of the blood ; immeasurably dissimilar, however, in degree. The latter raises a minute insignificant vesicle ;

shoulders and gave him a terrible bite, clawing him also severely about the breast. This case occasioned me great trouble and anxiety. He did at length recover. Sloughing often follows these bites, leaving unsightly scars.

the former occasional pain and weight in the præcordia, sickness, extreme collapse, and death.

Treatment.

The general indications are,—firstly, to prevent the absorption of the poison into the system by the application of a tight ligature above the wound and between it and the heart. Secondly, to scarify the bitten part, and to draw out the poison by sucking, or the application of the cupping-glass. Thirdly, to neutralize the poison by the free application of ammonia, caustic, or a strong acid. I have used the actual cautery with the best effect. Fourthly, to alleviate pain with anodyne fomentations and poultices.

When the virus has passed into the system strong stimuli must be administered, and repeated according to circumstances.

℞ Liquoris Ammoniaë, ℥xv.

Tincturæ Opii, ℥x.

Misturæ Camphoræ, ℥ij.

Misce fiat Haustus statim adhibendus et post horas duas repetendus; vel

℞ Spiritus Vini Gallici, ℥j. vel ℥ij.

Liquoris Ammoniaë, ℥x.

Aquæ Puræ, ℥iij.

Misce fiat Haustus.

Lint saturated with ammonia or spirit of turpentine should be applied to the epigastric region, carbonate of

ammonia to the nostrils, and general warmth to the whole system. When symptoms immediately dangerous to life are for the most part subdued, and reaction is manifest, then stimuli must be set aside, and a full dose of calomel and opium given :—

R Hydrarg. Chloridi, gr. vj.

Pulv. vel Extracti Opii, gr. ij.

Statim et post horas quatuor.

R Haustus Aperiensis, ℥iij.

Spiritus Ammon. Aromat. ℥ss.

Misce fiat Haustus et repetatur dosis, donec alvus soluta fuerit.

Emollient poultices should be applied to the wound, and the antiphlogistic treatment followed to complete the cure.

Stings of bees, wasps, hornets, scorpions, and mosquitos, should in the first instance (that is, before swelling, redness, or heat appears,) be gently rubbed with

R Liquoris Ammoniaë, f℥ss.

Spiritus Camphoræ, f℥ss.

Linimenti Saponis, f℥ss.

Tincturæ Opii, f℥ss.

Olei Olivii, f℥j.

Misce fiat Linimentum.

If, on the contrary, inflammation be set up, then apply the following on thin rag or lint :—

R Liquoris Plumbi Diacetatis, f℥ss.

Acidi Acetici Diluti, f℥ss.

Misturæ Camphoræ, f℥vij.

Misce fiat Lotio.

and administer calomel, opium, and saline sudorifics by the mouth.

When many mosquitos bite a person near the same part, they occasion very severe itching, and render it almost impossible to forbear scratching, nay tearing the part with the nails. This injudicious practice often induces subcutaneous inflammation, ulceration, and even sloughing sores. Emollient anodyne poultices, warm fomentations, very dilute nitric acid, or the sweet spirits of nitre, (Spiritus Ætheris Nitrici,) and ultimately the bark ointment, F. 33, are the local remedies. The general, — rest, salines, opium, and, lastly, quinine, acids, and steel.

SORE FEET.

This is a very troublesome complaint amongst soldiers marching in the field, and by no means easily got rid of, seeing they can scarcely remove the cause, viz. wearing tight and badly made boots. Something, however, remains to us.

Treatment.

Let the patient be excused from sentry duty, and as soon as he has come off the march let him put off his shoes, bathe his feet in tepid water, and dry them well. Any fresh vesicles should be punctured with a

clean lancet, and the serum pressed out. Recent raw surfaces should be dressed with

R Plumbi Diacetatis, gr. ij.

Cerati Cetacei, ℥ss.

Mist. fiat Unguentum ;

old sores with

R Cerat. Calamine, ℥ss.

Pulv. Opii, gr. x.

Misce.

Indolent unhealthy ulcers should be dressed with the bark ointment, and sloughing with nitric acid and poultices. As a good preventive, the soldier should be careful to oil or grease his shoes before a march, and to well soap his stockings outside over the sore parts. If not before the enemy, sore-footed men should be allowed to fall out, and to come up at their leisure. They will then be able to accommodate their gait to the state of their toes, and not according to the will of the commanding officers. It would hardly be fair to stop the grog : it would be as well, however, to bottle it up for a day or two. A comrade may, perhaps, drink it to serve a friend.

SPLINTERS, THORNS, &c.

When splinters, large thorns, pieces of iron, pins, and the like, get lodged in the substance of the foot, they immediately occasion intolerable pain, and speedily

great swelling, much general uneasiness, and considerable danger. They render the soldier utterly incapable of marching, and for a time unfit for service. He should be excused from all duty, and, if possible, conveyed from place to place.

With respect to treatment there are two opinions: one, that when these bodies are deeply or superficially embedded in muscles, and amongst nerves and vessels, they should be instantly cut down upon and removed; the other, that they should not be immediately cut down upon, but rather allowed to work their own way out. They are just as likely, however, to work out the patience of the patient and his life together.

Among the natives of India, who are accustomed to walk about bare-footed, the integument of the sole of the foot becomes exceedingly thickened, tough, hard, and horny. When, therefore, thorns or splinters get driven through this most unyielding structure, much force must necessarily have been applied, and much pain and irritation induced. To allow the offending body to remain will assuredly increase the mischief, and many times also the danger of tetanus; consequently no time should be lost in getting rid of them.

There are, however, a few things to be considered before proceeding to business, and a little preparation required. Firstly, these little operations are exquisitely painful, and not altogether devoid of danger. Secondly, that it is difficult sometimes to ascertain the exact position of the foreign matter. Thirdly, the patient will

now and then mislead you, and subject himself to unnecessary suffering, by declaring that there is extraneous matter in the wound, when there really is not. Fourthly, that these are fit cases for the administration of chloroform.

Treatment.

I need hardly say, that no operation should be performed until the presence and position of the foreign body be unequivocally ascertained. Under all circumstances, the first thing to be done is to place the foot in hot water, as hot, indeed, as can well be borne, and to move it about in the water until it be thoroughly well soaked. It should then be dried, and if the skin be still hard, warm oil may be rubbed in by the patient himself, who will rarely fail to discover the offending matter. These things having been done (with great relief to pain and tension), a full dose of calomel and opium should be given, and incision made in the course of the structures, and the thorn, &c. be extracted. Lint dipped in the lotion, F. 25, should be introduced a little way into the wound, and a poultice moistened with the same put over all. If there be hæmorrhage, pressure well applied will suffice to check it. The subsequent treatment is plain.

PAINS IN THE ABDOMEN.

The pain of which we treat is nothing more or less

than tormina—common gripes. It is, however, so frequent amongst marching men, that we must notice it as we pass.* It is not in any way dangerous, or likely to lead to danger; but it is troublesome enough. It is occasioned by gravitation of the intestines towards the inferior regions of the abdomen, by jolting in the saddle and long-continued walking. Some men suffer from it so sadly, that they can scarcely ever keep up with the column; yet they are not inconvenienced by it in camp, or on ordinary occasions. Pains in the side, commonly called stitch, are also troublesome: when they recur again and again in the same locality, more attention must be paid to them, as they become premonitory signs of incipient inflammation. They are generally simple muscular spasm, and should be treated as such.

Treatment.

For tormina, the patient should be allowed to fall out of the ranks, and directed to sit down for a time, or until the medical stores come up, when a dose of the antispasmodic mixture, F. 11, should be given, or a pill or two, F. 8.

* In marching from Mooltan to the Dera-Jhat with a regiment of horse, I was much annoyed by the constant request of the men to be allowed to fall out, in consequence of pain in the belly. Sometimes it is difficult to say whether a patient is pretending or not: real pain, however, can rarely be mistaken. It must not be considered a proof of malingering, when the same man often complains of the same complaint at stated times.

When the pain is very severe, a wide bandage should be carried round the lower part of the abdomen, or pressure made with the hands. The patient should lie down upon his back, and raise his feet and legs against a bank, or the trunk of a tree, so as to favour gravitation towards the upper region of the abdomen.* Tight belts round the waist are always injurious; in the present instance they are highly so, and should never be worn. A flannel bandage applied to the lower part of the abdomen is an excellent preventive, and should never be neglected.

For pains in the side, unattended with inflammatory symptoms, and purely spasmodic, a dose of

* R *Æther. Sulph. Comp.* fʒss.
Mist. Camphoræ, fʒiss.

will generally suffice, aided by rest and local pressure. A mustard poultice, or the spirit of turpentine applied on lint, will almost immediately remove these spasms,

* In cases of unmixed spasmodic tormina, standing for an instant or two upon the head will in almost every case give immediate relief. It would, we own, be comical enough to see long-legged soldiers standing on their heads by the road side; nevertheless, we recommend them to do so in default of other means. I could give endless examples of this remedial measure. In one instance, being on a pedestrian excursion in North Wales, my fellow traveller was often afflicted with gripes, and as often completely removed them by lying down near a gate, and carrying his feet from one bar to the other till he reached the top; thus resting on his shoulders, with his heels on the top of the gate.

and a dose of calomel and opium in a great measure prevent their recurrence.

RETENTION OF URINE.

It is not my purpose at present to treat of the various forms of retention so common amongst soldiers, but it is necessary to notice that kind which is the result of neglect to evacuate the bladder at the first demand. During forced marches, or in the hurry and excitement of battle, men will not, or cannot, stop to micturate. The consequence is, the bladder gets so much distended, that it cannot contract upon its contents; it becomes paralysed, and the patient at his utmost effort fails to void his urine. When immediately called to a case such as this, you introduce a catheter, draw off the urine, and the functions of the viscus are restored, without any fear remaining of future mischief. If, on the other hand, the patient does not, or cannot, instantly apply for aid, the bladder becomes more and more distended, until at length, being stretched to the utmost, and, as it were, ready to burst,* the urine is forced through the urethra in spite of all obstruction, and dribbles away. But it only dribbles, passes off as fast as secreted, and nothing more. The bladder remains distended as before, and the patient as impotent

* I have never seen a case of ruptured bladder from distension only. I question if the undiseased bladder ever bursts.

as ever to empty it. Nevertheless, he feels relief, and thinks the danger passed. He neglects to seek medical advice, and thus the contractile power of the bladder is lost, leading to confirmed paralysis, acute inflammation, sloughing, extravasation, and death.

Treatment.

When applied to in the first instance, introduce a well oiled full-sized catheter, and draw off the whole of the urine. Enjoin rest for a brief period, and direct the patient to apply in the morning for a day or two, in order that the bladder may be examined.

In the second instance you must be more careful in evacuating the contents of the bladder, and also in examining its condition in the hypogastrium. If there be feverish and inflammatory symptoms, blood must be taken from the arm, leeches applied to the perineum, calomel and opium given by the mouth, together with purgatives and saline sudorifics. The pill, F. 6, every six hours. Fomentations and the bath are desirable; low diet, and abstinence from spirituous and fermented liquors. A suppository passed into the rectum, and carried well above the sphincter, gives always great relief.

For loss of contractile power and paralysis, a steady course of tonics, together with generous animal diet, a small quantity of good wine, cold bathings, and frictions over the hypogastric region, should be diligently pursued. The following medicine, administered under the eye of the surgeon, and the dose regulated accord-

ing to its effects, will rarely fail in effecting a complete cure :—

R Tincturæ Cantharidis, ℥x.

Tincturæ Capsici, ℥xij.

Tincturæ Ferri Sesquichloridi, ℥xx.

Syrupi Simplicis, ℥iss.

Aquæ Puræ, ℥iss.

Misce fiat Haustus ter die sumendus.

A dose of castor-oil should be occasionally interposed, and the following liniment rubbed over the region of the bladder :—

R Tincturæ Cantharidis, f℥ij.

Linimenti Camphoræ, f℥j. f℥ij.

Misce fiat Linimentum.

IRITIS AND OPHTHALMIA.

I need hardly say, that these discases are exceedingly common in the army, and of every kind and degree of severity. They in themselves afford matter sufficient for lengthy debate, and are worthy of our careful consideration. I cannot stop to speak of them further than relates to traumatic forms, those that are the effect of punctures or contusions. Iritis is very often the result of penetrating wounds, less often of bruises.

Deep-seated pain in the orbit and the head, with feverish symptoms, will lead you to suspect iritis. Discolouration of the iris, with contraction and irregularity

of the pupil, together with impaired vision, will be conclusive evidence of inflammation. You estimate the change of colour by comparison with the sound organ; and the age of the disease by the adhesions of the iris to the capsule of the lens, and by its power of contraction and dilatation.

Treatment.

In hot climates there are few diseases more rapid in their progress than acute iritis. If it be unnoticed and unchecked, it speedily leads to irreparable disorganization, and total loss of vision. Nevertheless, there are few diseases more under the control of prompt and decided curative measures; and the most potent of these are, general depletion, and the free administration of calomel. As cupping-glasses and their appurtenances are not always at hand, and good leeches not procurable, let sixteen ounces of blood be taken from the arm; or the temporal artery may be opened.* Let a full dose of calomel be given immediately, and at intervals of four hours the following:—

* To open the temporal artery, search for a large branch a little above and external to the outer canthus, and make an incision immediately over it with a sharp scalpel; then open the vessel with a lancet, and take the required quantity of blood; after which completely divide the artery, and apply caustic to the wound. Rub it in well, and it will check hæmorrhage, and at the same time occasion an excellent issue, which may be kept open if necessary for any length of time.

R Hydrargyri Chloridi, gr. ij.

Pulveris Opii, gr. $\frac{1}{8}$

until symptoms of ptyalism be manifest, or rather until the iris begins to recover its natural colour and function. Then let it be given less frequently, and only in sufficient quantity to maintain its effects, until the cure be complete. The extract of belladonna is most useful on the second day, as an application to the eyebrows: it powerfully dilates the pupil. I am accustomed to use it in combination.

R Extracti Belladonnæ, ʒj.

Unguenti Hydrarg. Fort. ʒss.

Misce bene, et fiat applicatio.

Washes to the eye itself are not desirable. Warm water may be occasionally used to clean the organ. It is all-important to exclude the light. These means will quickly effect a cure.

The cure of traumatic ophthalmia is commonly easily brought about by depletion, low diet, saline medicines, purgatives, and abstinence from wine, beer, and spirits. Take in the first instance ten or fifteen ounces of blood from the external jugular vein. Let the patient's head be steadily held; then place your left thumb on the vein, about an inch above the clavicle, and open the vessel freely with a very clean and sharp lancet. When sufficient blood has been

drawn, bring the lips of the wound together, and apply two short strips of plaster crosswise. The poppy fomentation, well strained, or the following lotion, are the best local applications in the early stage.

R Extraeti Opii, ʒj.

Aquæ bullientis, Oj.

Tere in mortario, et cola.

These should be very gently applied, used warm. In the second stage, any astringent collyria may be substituted, to complete the cure.

R Liquoris Plumbi Diaacetatis, fʒss.

———— Ammoniaë Acetatis, fʒiiiss.

Aquæ Puræ, fʒj.

Misce fiat Lotio.

In extreme cases, after the use of calomel, quinine and steel will be needed, together with generous diet, and change of air and scene.

BURNS FROM THE EXPLOSION OF POWDER.

These are very terrible and very fatal injuries; they are usually caused by the explosion of powder magazines, occasioned by the bursting of a shell or passage of a round-shot. They differ not from burns in general, except, perhaps, so far as the skin is commonly stuck full of sand, gravel, and unburnt powder.

The symptoms, in brief, are divisible into two kinds : the one, extreme collapse, which is soon followed by coma and death ; the other, delirium tremens, or, more properly, prostration with excitement, which is scarcely a less fatal symptom, although not so instantaneously followed by dissolution.

Treatment.

Amongst the multifarious remedies and methods for the cure of burns, I will not pretend to determine which is best. In the case before us our measures must be governed by circumstances. When men are being blown up by scores,* and dreadfully scorched from head to foot, it would be idle to halt between two opinions. What we do must be done quickly, and wholesale. Those remedies are best which present themselves in greatest abundance, and are easiest applied. These are, oil and lime-water, wheaten flour and cotton. With one or other of these the burnt parts must be completely covered, and the patient afterwards completely rolled up in a blanket. He must be treated according to symptoms. If he present those of the first kind, stimuli must be given, such as wine,

* At the first siege of Mooltan, upwards of twenty men, on one occasion, were brought to my hospital more or less burned by powder. A round-shot passed through a powder cart, which was being dragged into a battery, and in an instant it was blown into the air. Seven or eight men died of their injuries ; many remain cripples for life.

brandy, and ammonia: opium must not be administered. If of the second order, then opium is the sheet-anchor, and should be combined with stimulants, as F. 10, or, what is still better, F. 23.

The after-treatment is a long, painful, melancholy, unsatisfactory business. The remedies are tonics and alteratives, and carefully regulated diet. More depends upon the last measure than any other. Too much food is highly injurious. The appliances are splints, bandages, and pads; poultices and fomentations. As an anodyne unguent for suppurating surfaces, I do not know anything equal to the bark ointment, F. 33.

COUP DE SOLEIL.

Stroke of the sun is, in the torrid zone, very common, and, unfortunately, very fatal to Europeans. It is occasioned by the direct rays of the sun playing upon the badly-covered head, aided, indeed, by great exertion in an atmosphere of 150 degrees Fahrenheit. Children are not so readily affected by it as young men; young men as aged. Old men are soonest knocked down, and frequently die upon the spot where they receive the blow. Coup de soleil often kills Europeans of every age; it is always a dangerous affection, and when very slight should not be neglected. It should be strictly guarded against; prevention is here emphatically better than cure. Europeans should

therefore be exposed as little as possible to a summer sun in India; they seldom are, except in times of war, and then there is no help for it. When they do take the field in the hot season, every man should be strictly ordered to protect his head, and especially his temples, by sundry folds of linen cloth carried several times over his cap and round the brows.

It would be well for Europeans not to eat much just before exposure to a tropical sun. Drinking beer or spirits often leads to fatal consequences; it cannot be too strongly forbidden, nor too positively protested against. The officers in India are fully aware of its pernicious effects; the privates should be constantly reminded of it, and if possible prevented from procuring liquor.

Intense heat is in every instance the cause of *coup de soleil*. Intemperance, diseased cerebral vessels (whence old men are most liable to it), and affections of the heart (hence a person with diseased heart should not expose himself to an Indian sun), predispose to it.

Congestion appears to be in every case the proximate cause; perhaps congestive apoplexy the disease itself. It sometimes, however, terminates in inflammation and its consequences.

The cases are of every degree of severity, from those that speedily kill the patient, to those from which (after a short period of stupor) he completely recovers. In very severe cases the patient falls senseless to the ground and dies; or he lies in profound coma, from which he cannot be roused, with small feeble pulse and

almost suspended respiration. In others, violent pains in the head, giddiness, loss of speech, present themselves; and the patient gradually sinks into insensibility, with strong, hard, bounding pulse, violently throbbing carotids, and stertorous breathing.

The slighter forms of this disease are indicated by pain, and a sense of pressure or tightness in the temples; drowsiness, vertigo, impatience of light, and sickness. Sometimes these symptoms do not come on until many hours after exposure,—sometimes not for days; consequently it is very necessary, after great excitement, exertion, and exposure to the sun, that a little care and abstinence should be used for twenty-four hours at least, in order that this last form (which, I believe, most often leads to inflammation) may be guarded against.

Treatment.

Our remedial measures should be vigorous, prompt, and decisive, and pursued until their effects be fully manifest. General bleeding is, in a great majority of cases, the surgeon's hope. Some discrimination is, however, necessary, as it is not always right to take blood. In our first example, where the patient falls, as if he were shot, to the ground, with scarcely perceptible pulse and nearly suspended respiration, venesection would most assuredly hasten dissolution. Cold to the head, warmth to the extremities, stimuli to the nostrils, frictions over the surface of the body, and

mustard poultices, or spirits of turpentine, to the region of the stomach, with turpentine enemata, are the primary remedies. In the second and third forms of the disease general abstraction of blood is clearly indicated. It should be taken from the arm, or, what is better, from a jugular vein, until relief be apparent. Next, the patient should be placed in a very dark situation, and in a position to favour gravitation from the head. Give immediately by the mouth

R Hydrarg. Chloridi, gr. x.

Pulveris Jalapæ, gr. xxx.

M. Pulv.

and wash it down with

Haustus Aperiens, fʒiv.

and let a purgative injection be thrown into the rectum. Next to the foregoing remedies, the application of cold water to the scalp is most powerful. The head should be quickly shaved, and the coldest procurable water, or an evaporating lotion, applied. Cold water poured upon the head from a tea-pot, tea-kettle, or eup, in a continuous stream, is a most efficient remedy, and should never be neglected.* It may not be continued

* In July 1849, I was requested by Sir Henry Lawrence to proceed, at my utmost speed, to the assistance of a gentleman holding an important civil post on the banks of the Ravce, about 70 miles from Lahore, who was said to be dying from the effects of the sun and fever.

I found this gentleman ill to the last degree, lying prostrate

for any great length of time, as it produces considerable depression of nervous power; it may, nevertheless, be again and again resorted to, the scalp being covered in the intervals with thin old linen cloth kept wet. The

on the bed, muttering incoherent nonsense, apparently incapable of moving his lower extremities or turning round, whilst the upper were being constantly moved about, and the hand pressed to the sides of the head. The head rolled incessantly from side to side, with the eyes partly open and pupils dilated. The pulse was quick, small, and very feeble: notwithstanding, however, the vessels of the head appeared surcharged. The face was flushed, and the brows very hot. In fact, the head seemed superabundantly supplied with blood, whilst the body was dying from exhaustion. In short, this was a case of extreme prostration, with most serious cerebral oppression. I concluded it was necessary to support the general system, and at the same time relieve the oppressed brain. I could not hope much from my stock of medicines, viz. salts, oil, soda, and camphor: whereupon I gave an ounce of wine beaten up with the yolk of an egg and two ounces of water every four hours. I placed the patient upon a bed with his shoulders resting on its edge, and his head upon a chair, shaved the scalp, and poured cold water over the whole of it, from a vessel with a spout, for hours together. Two men were ordered to this duty, who relieved each other, whilst I watched the effects: namely, the head, before rolling about, became instantly quiet, the arms sank gradually to the sides, the eyes closed as in sleep, the pulse became more soft, the breathing slower, and still more slow, until it was necessary to suspend the remedy for a time. In ten minutes or so the patient became more restless, muttered a sound or two, and pressed his hands upon his head, and again sank to repose, when the water was again poured on. This gentleman (Mr. Egerton) is now in this country, perfectly well, and about to return to India.

collateral remedies are, cupping, leeching, blistering (blisters should not be put upon the scalp; they prevent the application of cold water), saline purgatives, and sudorifics. Lastly, alterative doses of mercury, with great abstinence from stimulating food and drink, and especially mental excitement, together with a total change of climate, may be absolutely necessary to complete the cure.

THE END.

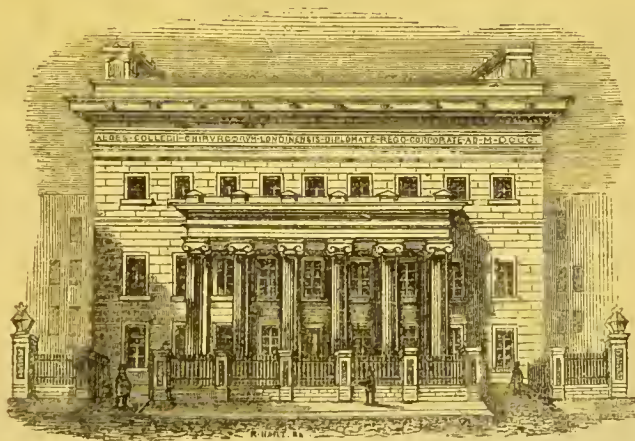
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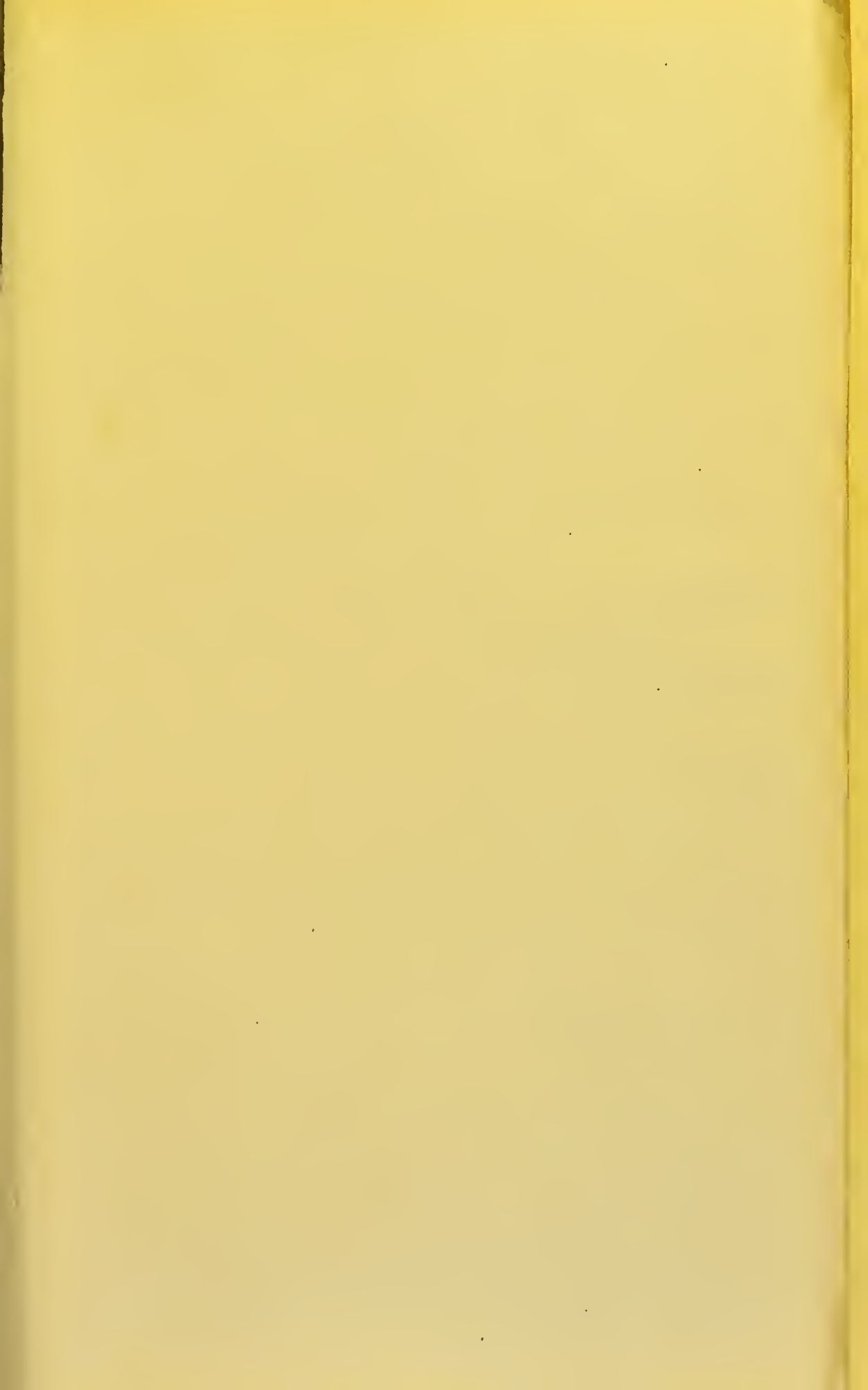


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